POSSELT'S HAND BOOKS
OF THE TEXTILE INDUSTRY, VOL. I.

Dictionary of Weaves

PART I.

Lexicon der Gewebemuster

Band I.

Manuel des Dessins du Tissage

Ire Partie

TEXTILE PUBLISHING COMPANY
154 North 21st St., Philadelphia
on, Eng.: Sampson Low, Marston & Co., Ltd.

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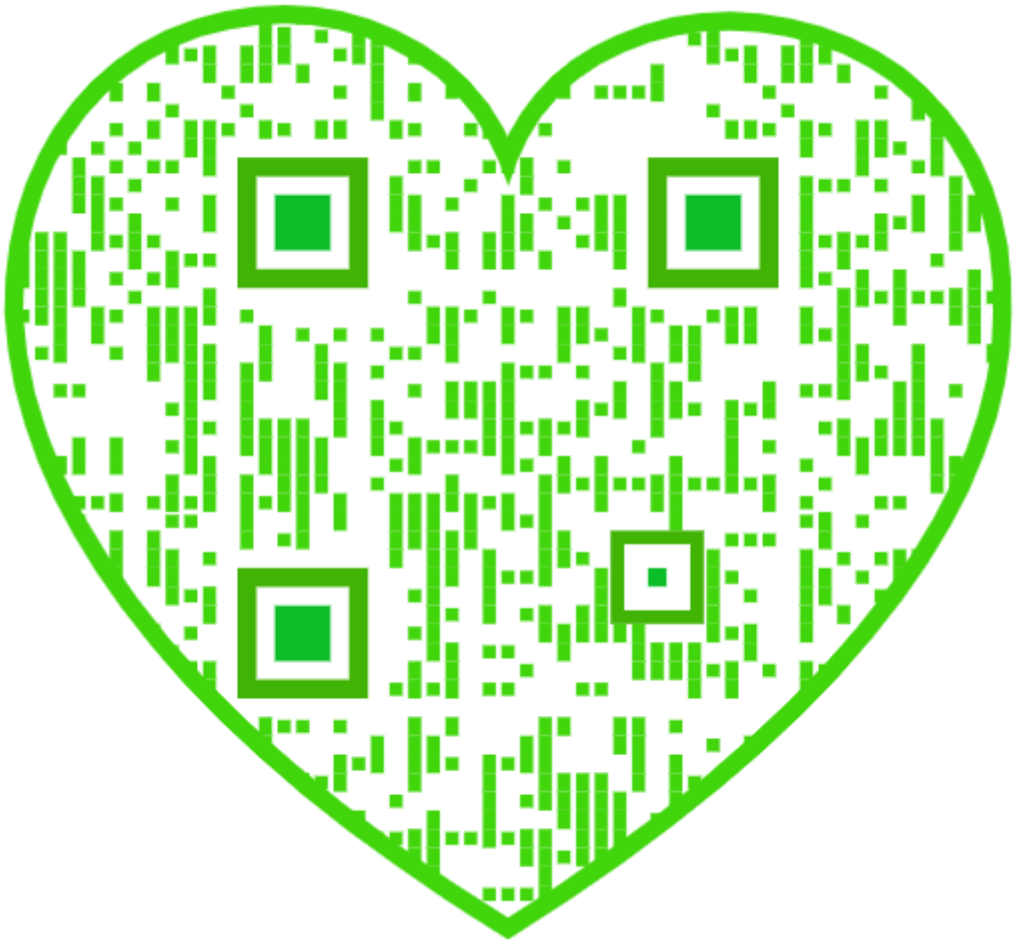

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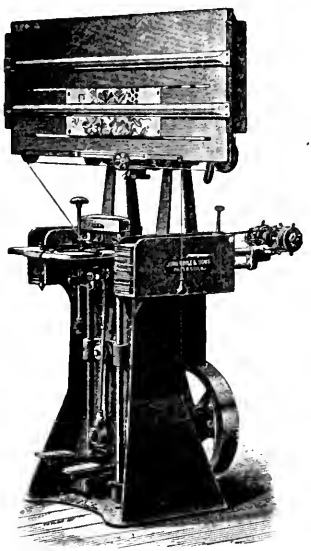

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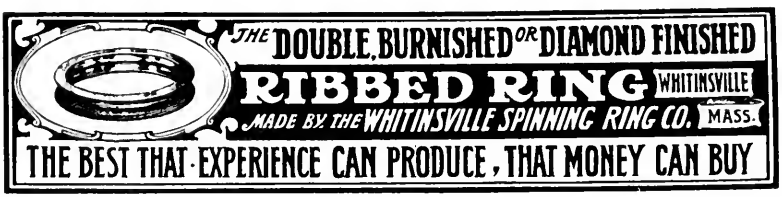
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HAND BOOKS OF THE TEXTILE INDUSTRY, VOL. I.

Dictionary of Weaves

PART I.

A COLLECTION OF ALL WEAVES FROM FOUR TO NINE HARNESS

By E. A. POSSELT
Editor of Posselt's Textile Journal

Two Thousand Weaves Conveniently Arranged for Handy Use

Lexicon der Gewebemuster

Band I.

Eine Sammlung von allen Gewebemustern von vier bis neunschäftig. Zwei Tausend Gewebemuster für den praktischen Gebrauch geordnet.

Manuel des Dessins du Tissage

Première Partie

Une collection de Tous Genres des Dessins du Tissage de Quatre à Neuf Lisses.
Deux Milles Dessins Classés à Convenance.

TEXTILE PUBLISHING COMPANY
2154 North 21st Street, Philadelphia
London, Eng.: Sampson Low, Marston & Co., Ltd.

PREFACE

The purpose of these Hand Books is to bring the Various Branches of the Textile Industry conveniently arranged before the reader so that he may consult whatever subject of the Industry he is more particularly interested in.

The present Volume of this Series of Hand Books, the

Dictionary of Weaves, Part 1,

covers a collection of all the Weaves for Four, Five, Six, Seven, Eight and Nine Harness, and which will be followed by successively issued parts, covering all the weaves possible to be made up to Twenty-four Harness. One of these parts will be issued regularly every year, the next part to deal with Ten, Eleven and Twelve Harness Weaves, etc.

In designing these weaves, stress has been laid on selecting such weaves as will be of practical value.

The various repeats of this collection of weaves have been kept separate as much as possible; the repeat of the warp-threads, *i. e.*, number of harnesses necessary for each weave is indicated on top of each page, whereas the numerals on the bottom of each page indicate a summary of the repeats of all weaves given, both warp and filling ways. The numeral in front of the multiplication sign indicates the repeat for the warp-threads, the numeral after the multiplication sign that for the filling.

The grouping of the various repeats of weaves on each plate are such that the eye can readily grasp the repeat filling ways of any one of the collection of weaves given, by consulting the sets of numerals at the bottom of the page, and which, provided more than one set of numerals are used, are indicated corresponding side by side to that of the arrangement of the weaves in the collection above it.

Wherever possible to do so four repeats of the weave are given in order to convey a good idea of its general effect in the fabric. To simplify subject to the designer, in most all instances complete repeats of a weave are given, whereas with such weaves where more than one repeat is shown in order to bring such weaves within compass of the plate (referring to large pronounced effects) by consulting the proper set of numerals on the bottom line the eye will readily grasp the repeat of the pattern.

With reference to other Branches of the Textile Industry and which will be taken up in successively issued volumes of these Hand Books, besides the serial continuation of the Dictionary referred to, Books on the following subjects are now in course of preparation: Designing and Weaving of Narrow Ware Fabrics; The Finishing of Ribbons and Trimmings; The Analysis of Textile Fabrics; Silk from Cocoon to Loom, etc.

VORWORT

Der Zweck dieses Werkchens

Lexicon der Gewebemuster, Band 1,

ist, jedem Webereibeflissenen zu ermöglichen mit einer Vorrichtung von Vier bis Neun Schäften massenhafte Musterungen auszuführen. Nur Bindungen von praktischem Werth sind gegeben.

Jedes Jahr wird ein neuer Band erscheinen; der nächste wird die Gewebemuster für Zehn, Elf und Zwölf Schäfte bringen.

INTRODUCTION

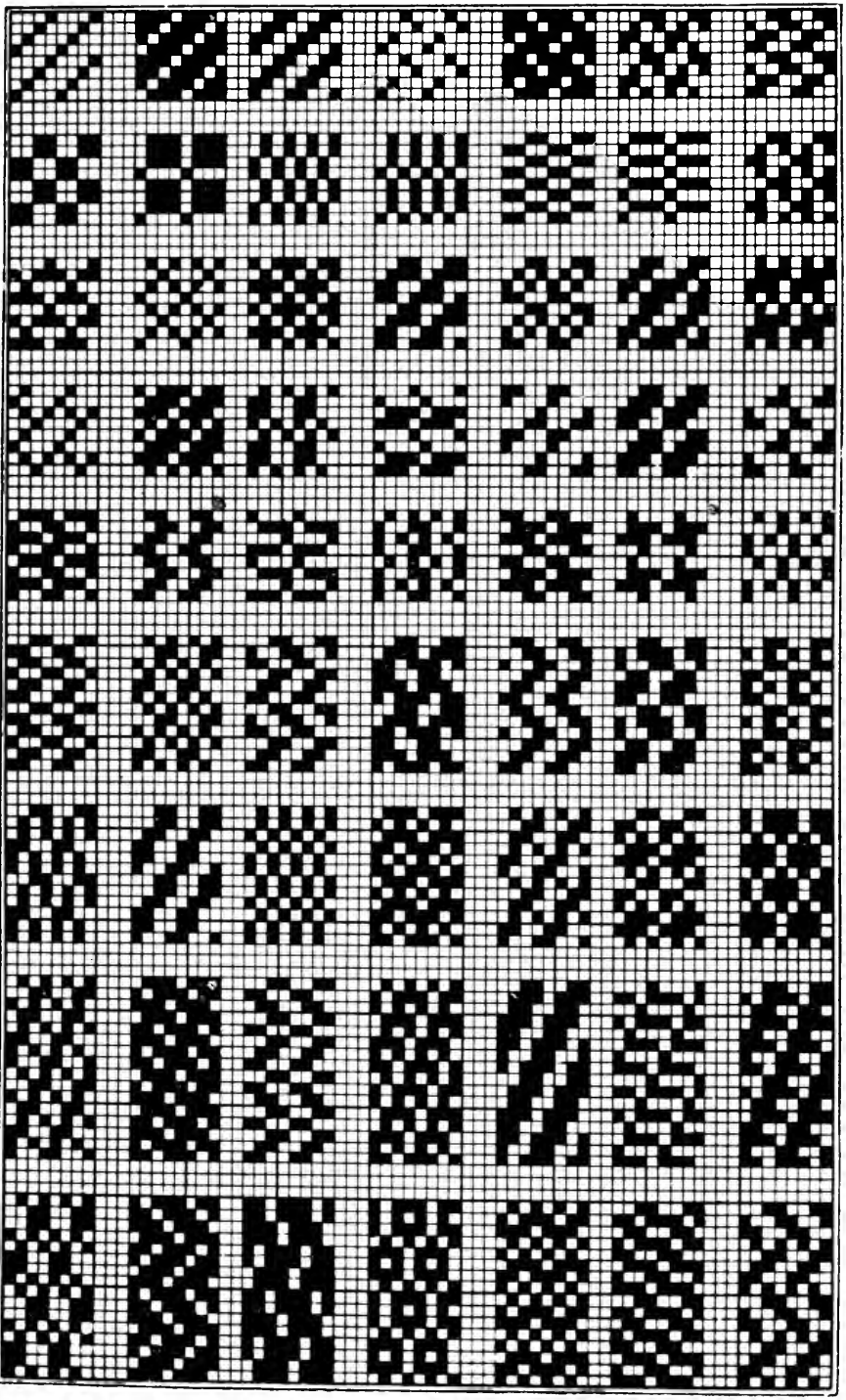
Le present volume d'une serie de manuels couvre une

Collection d'Armures, Première partie

toutes les armures pour quatre, cinq, six, sept, huit et neuf lisses.

D'autres volumes vont suivre, couvrant toutes les armures possibles jusqu'à vingt-quatre lisses.

Un volume va paraitre chaque année, le prochain contiendra les armures à dix, onze et douze lisses.



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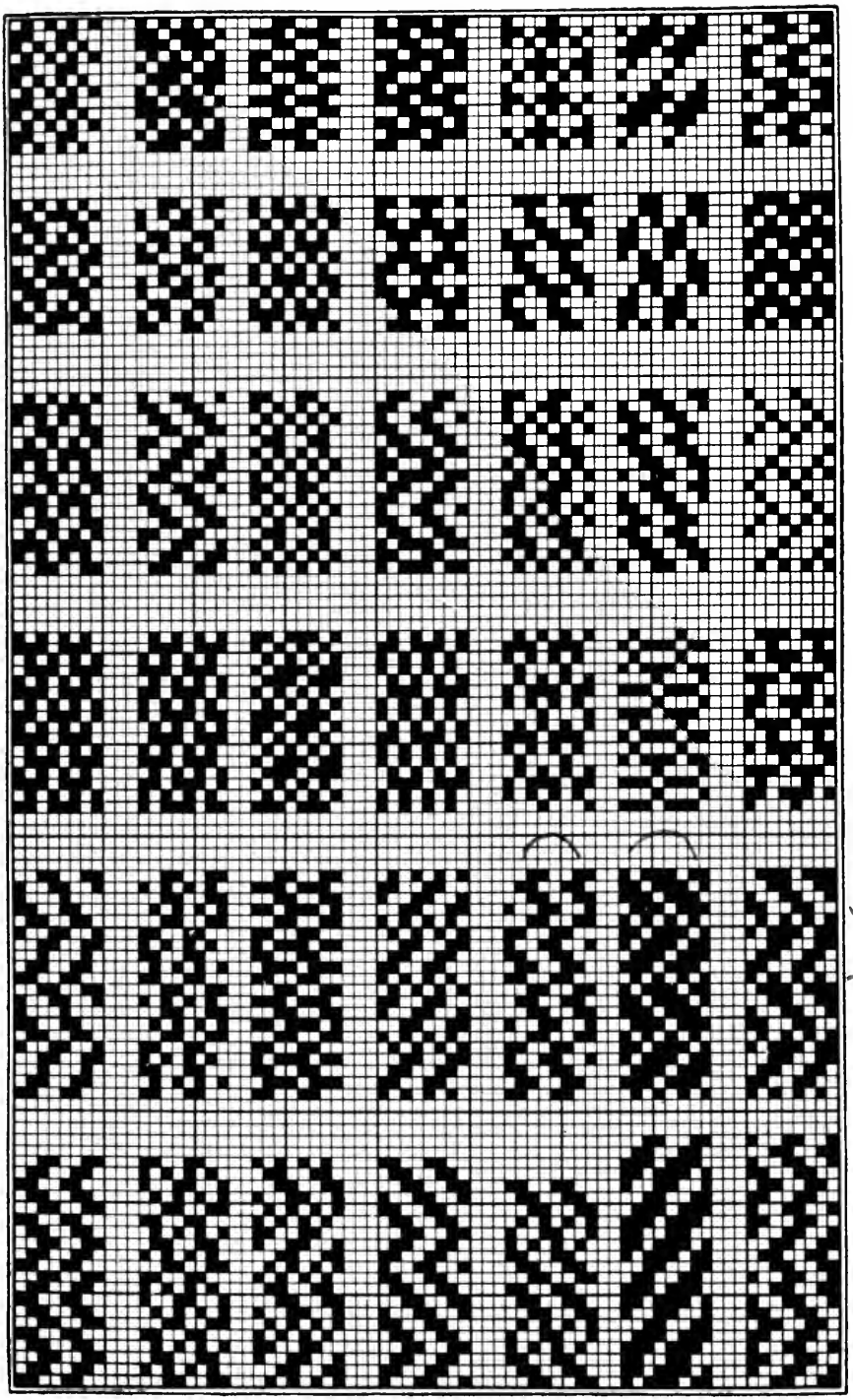

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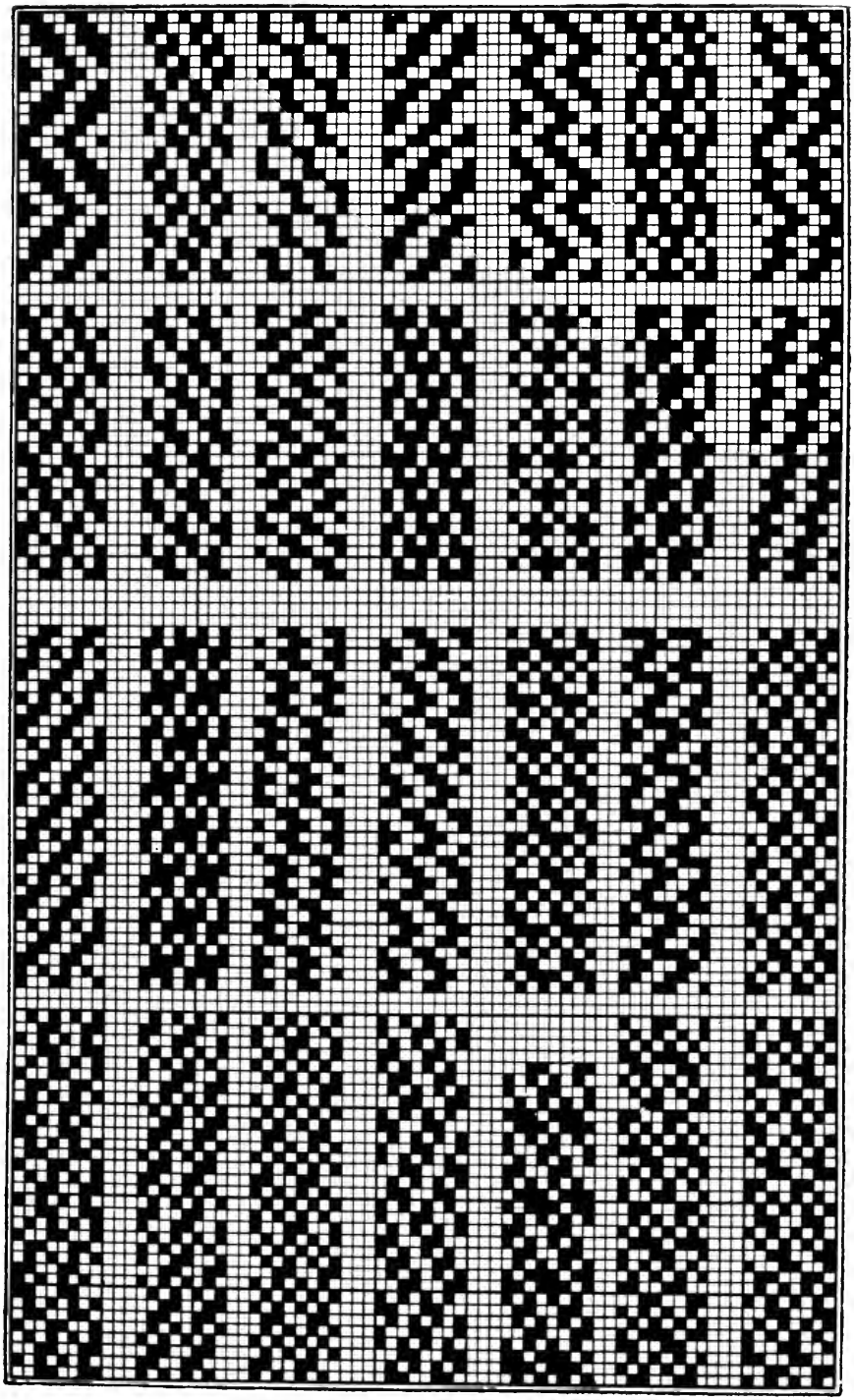

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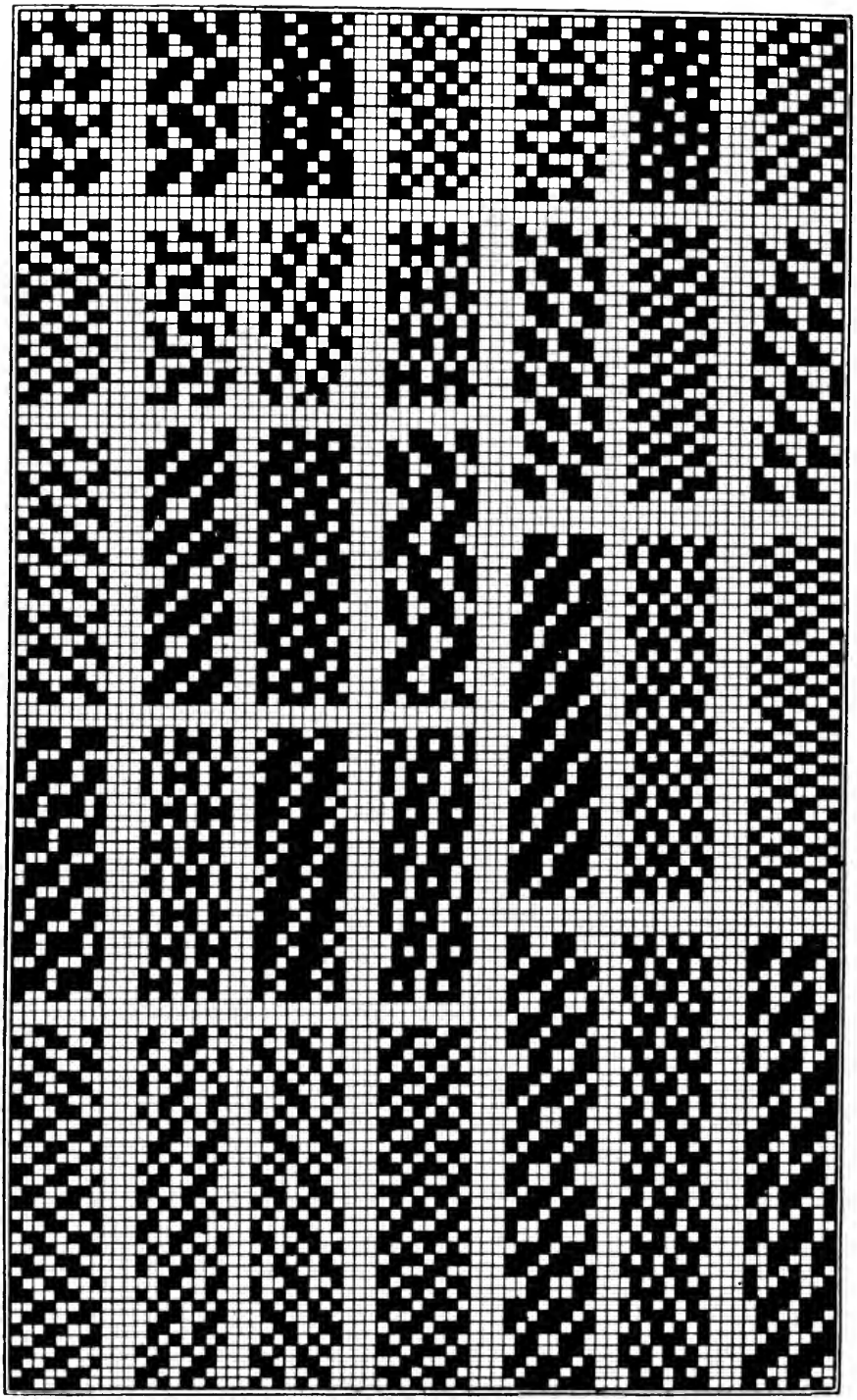

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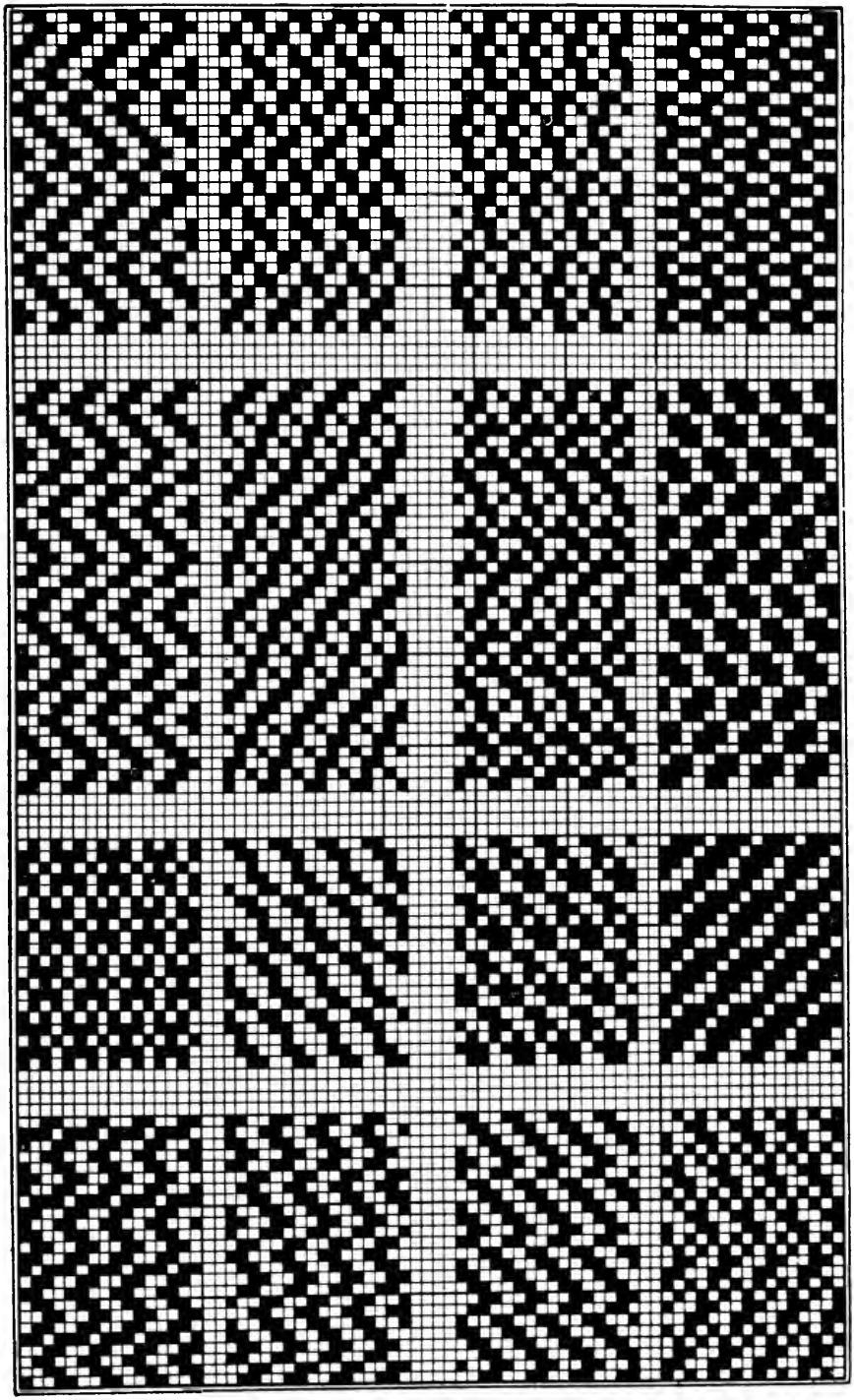

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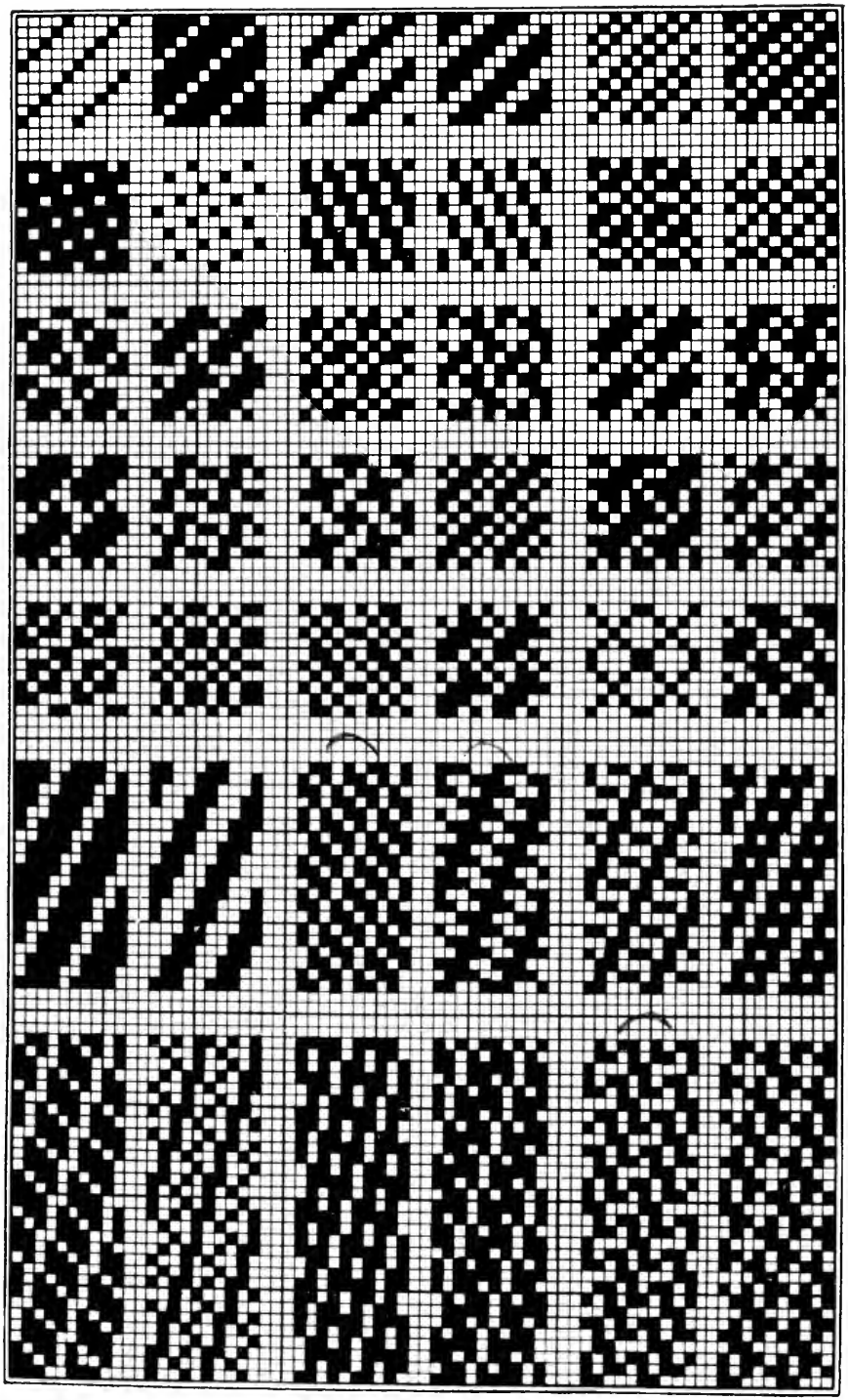

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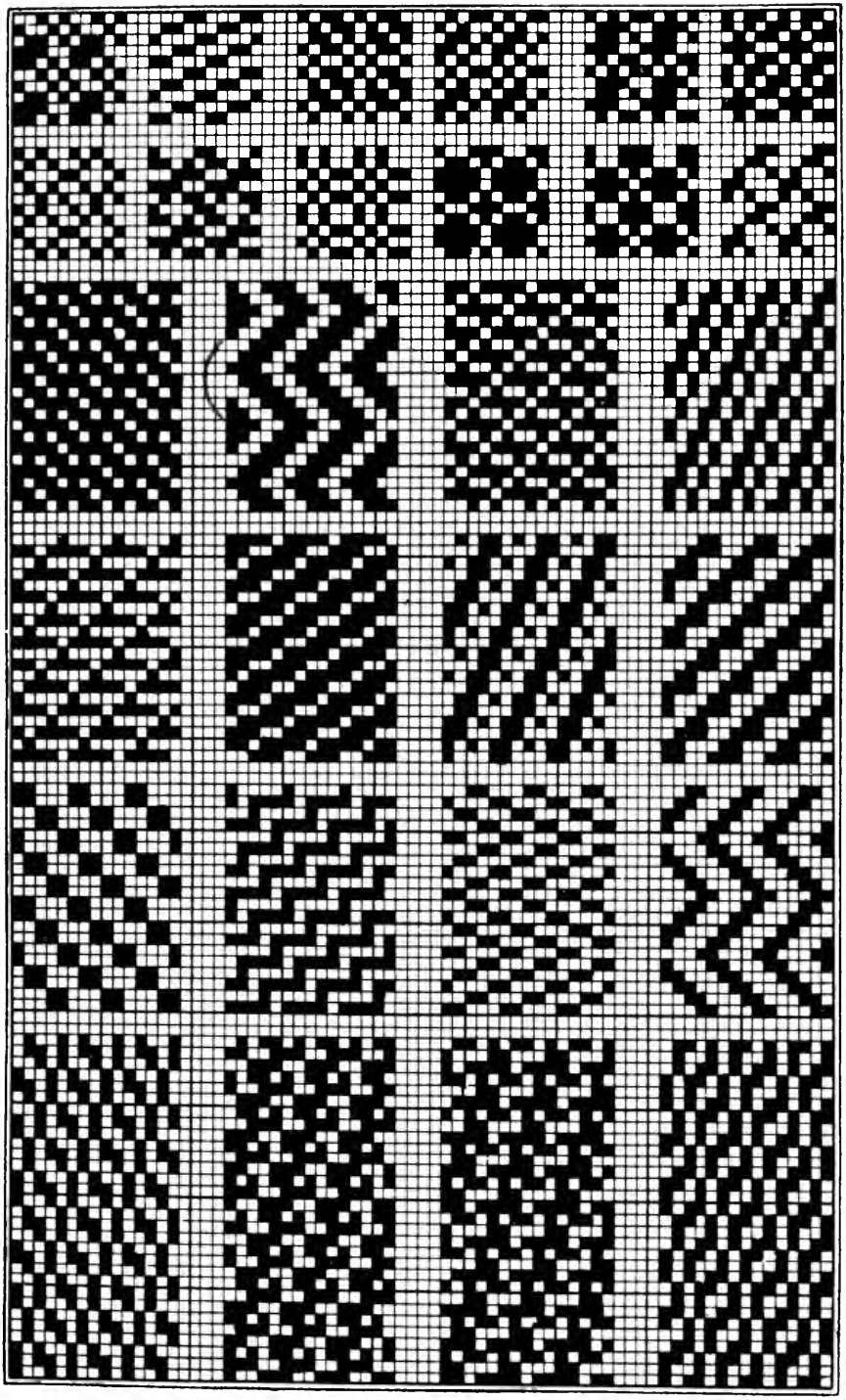

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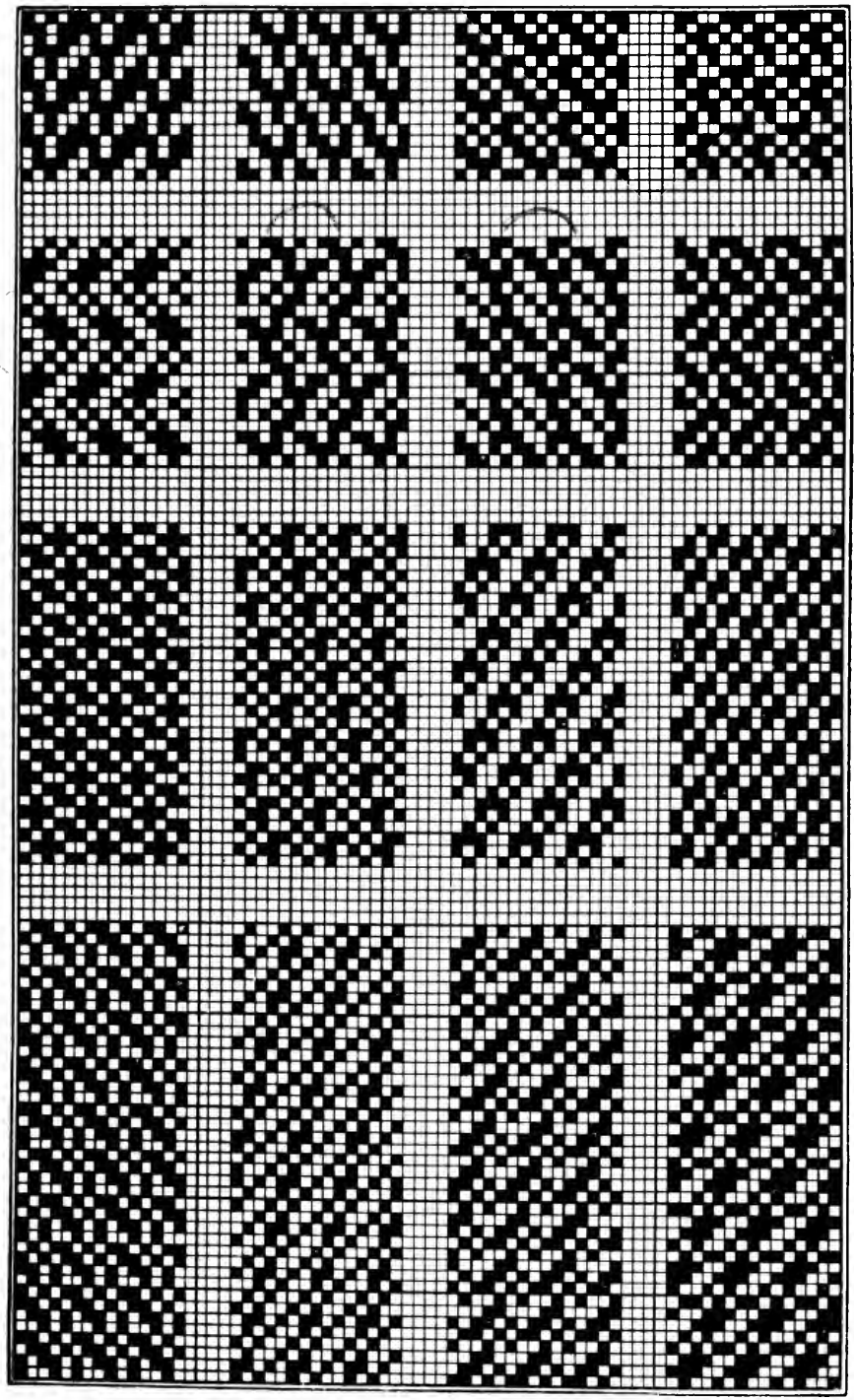

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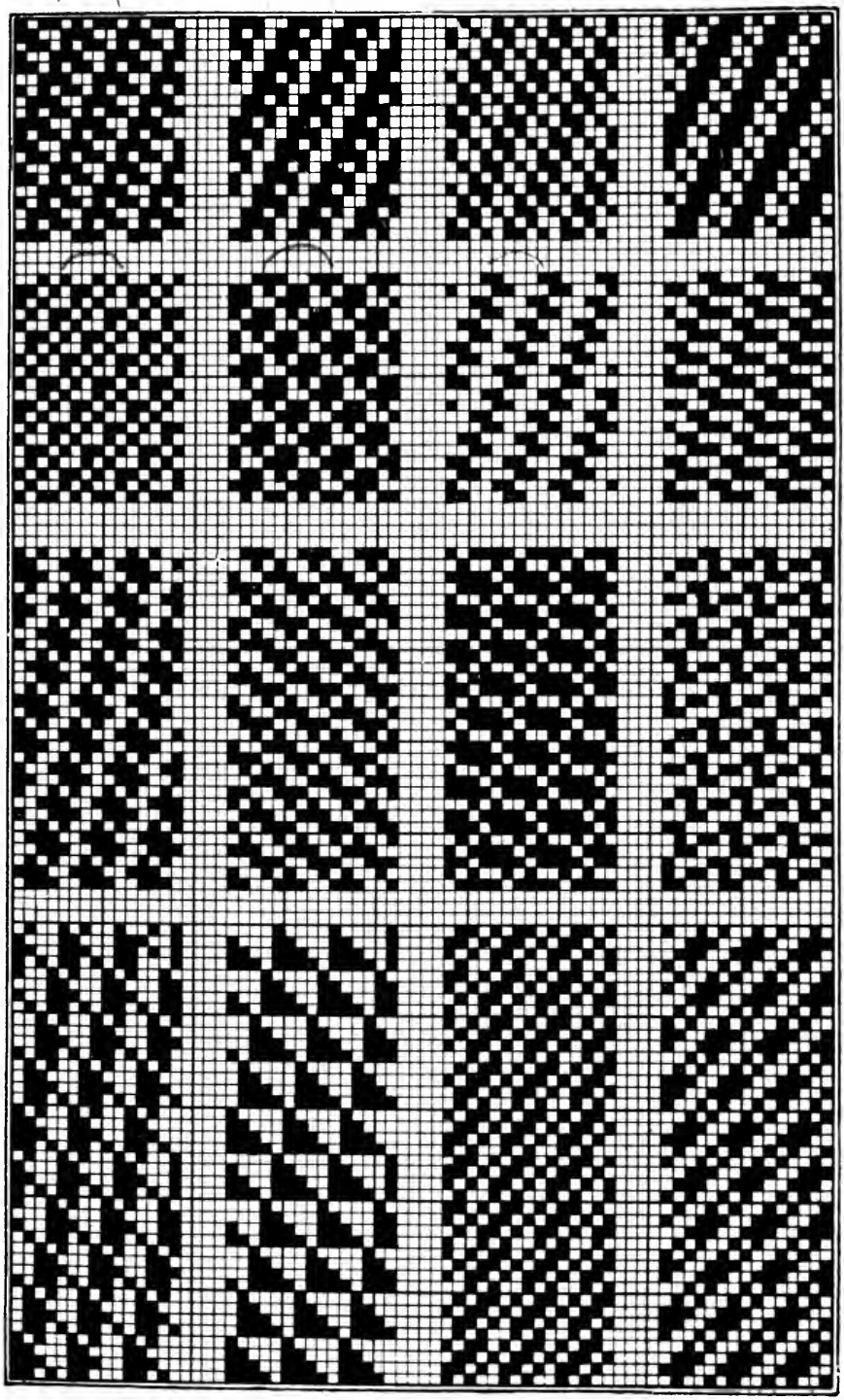

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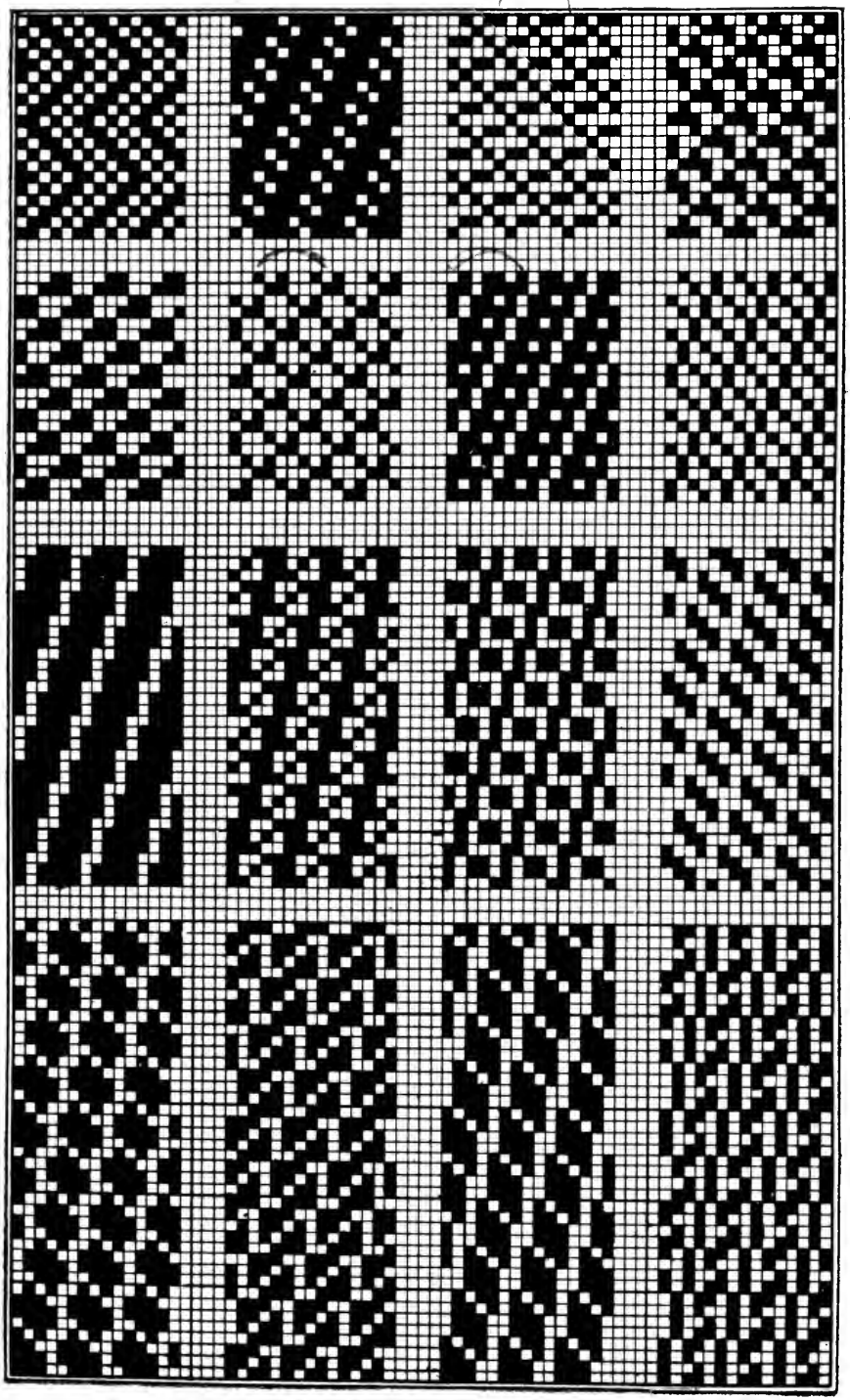

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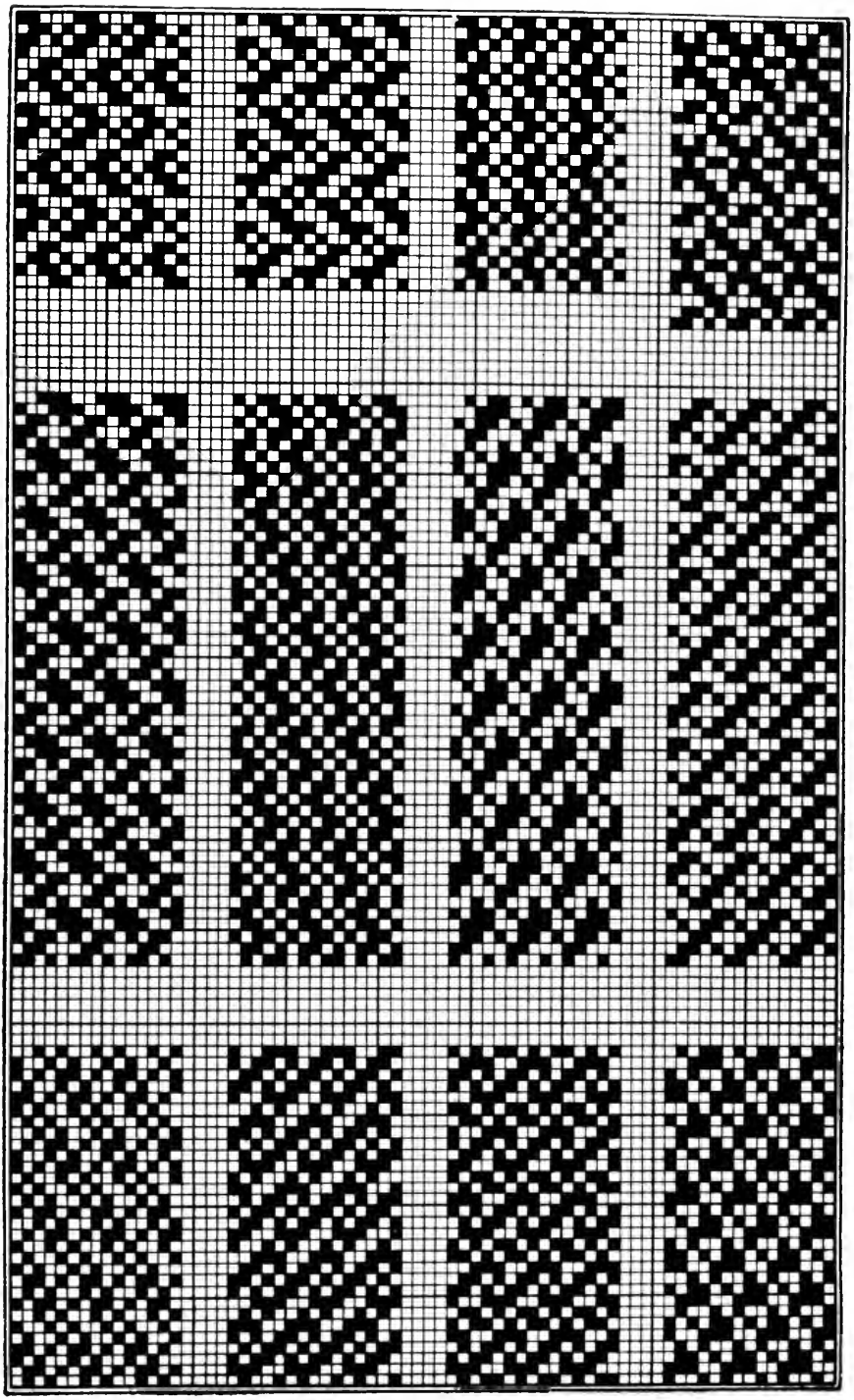

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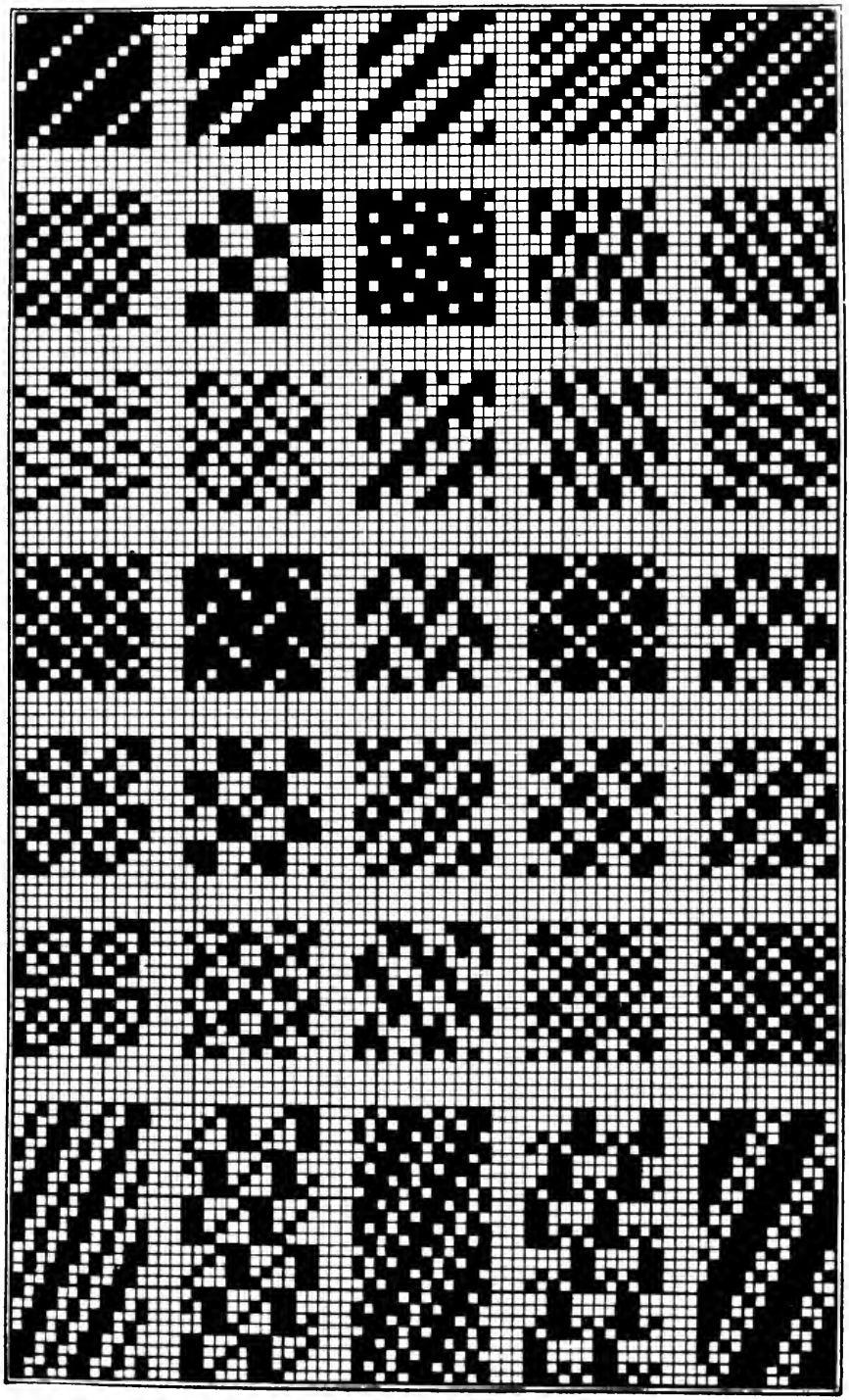

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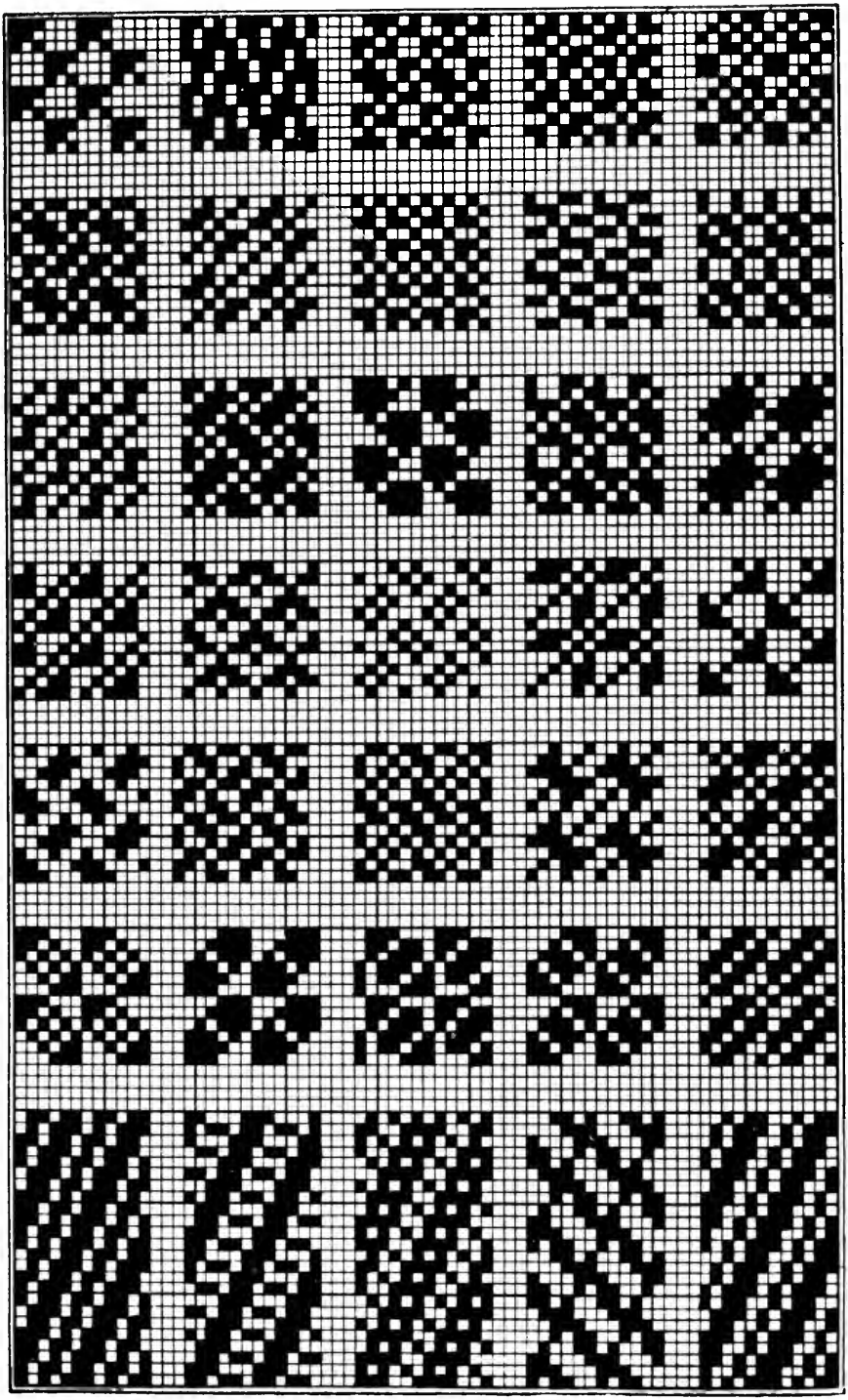

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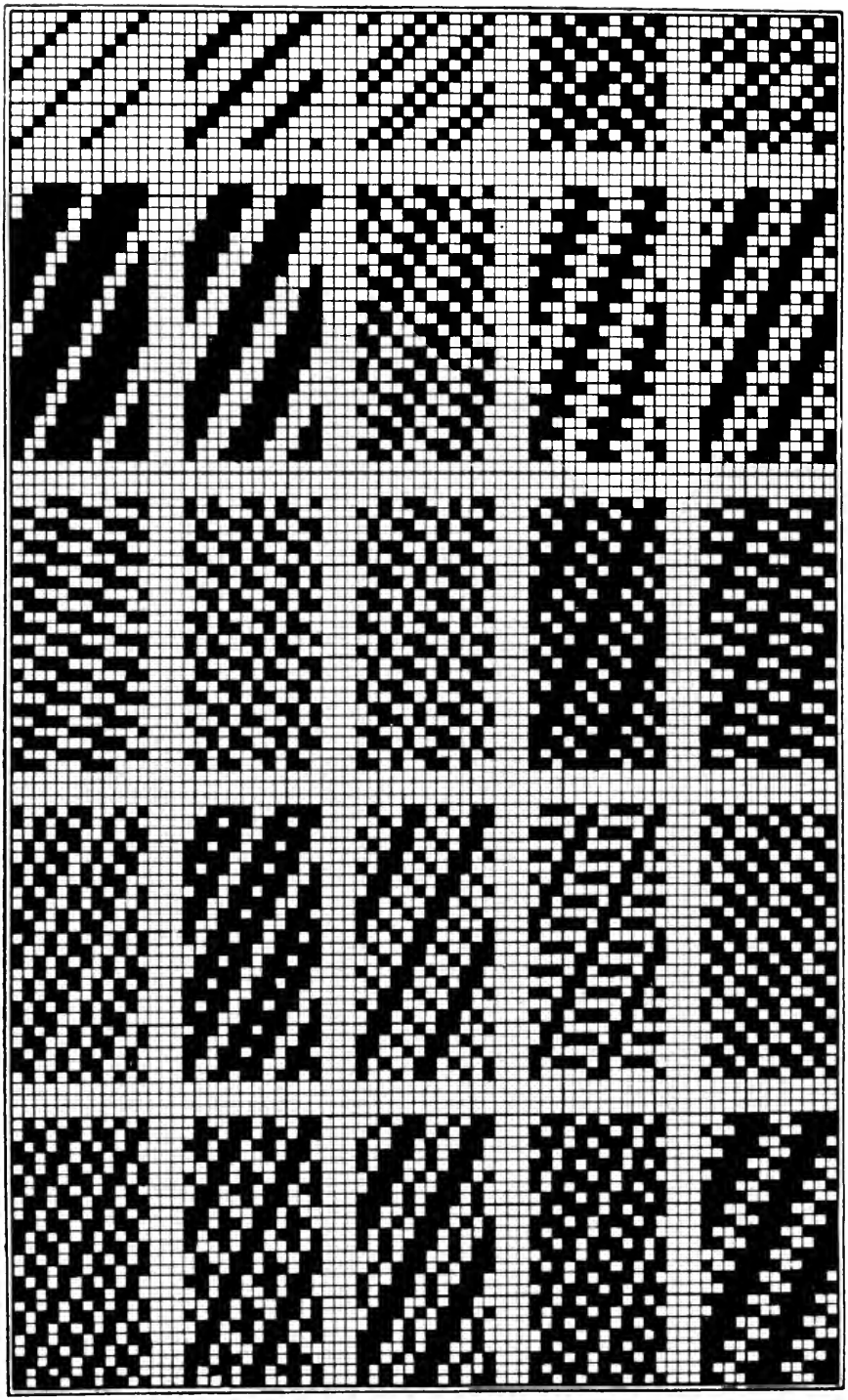

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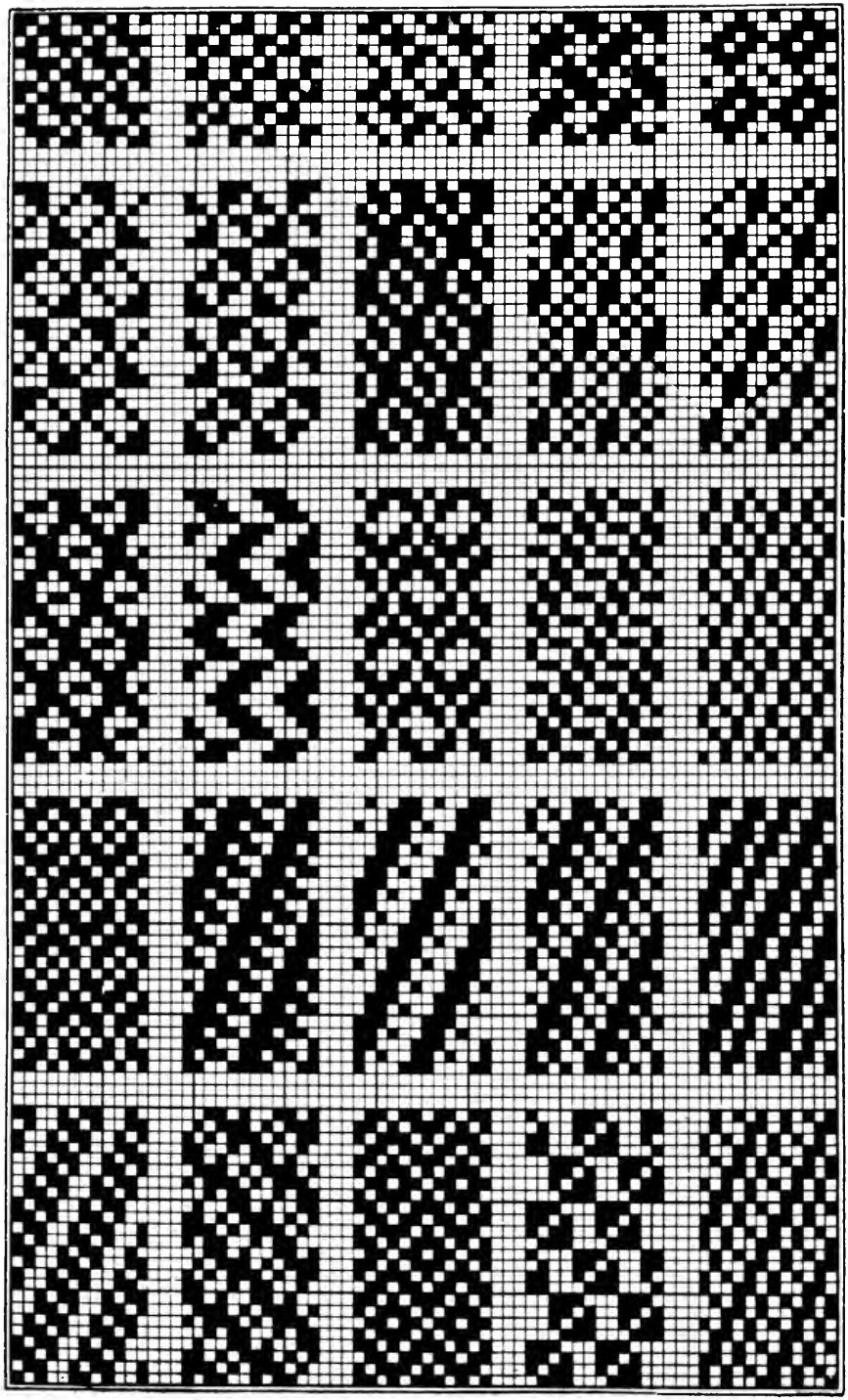

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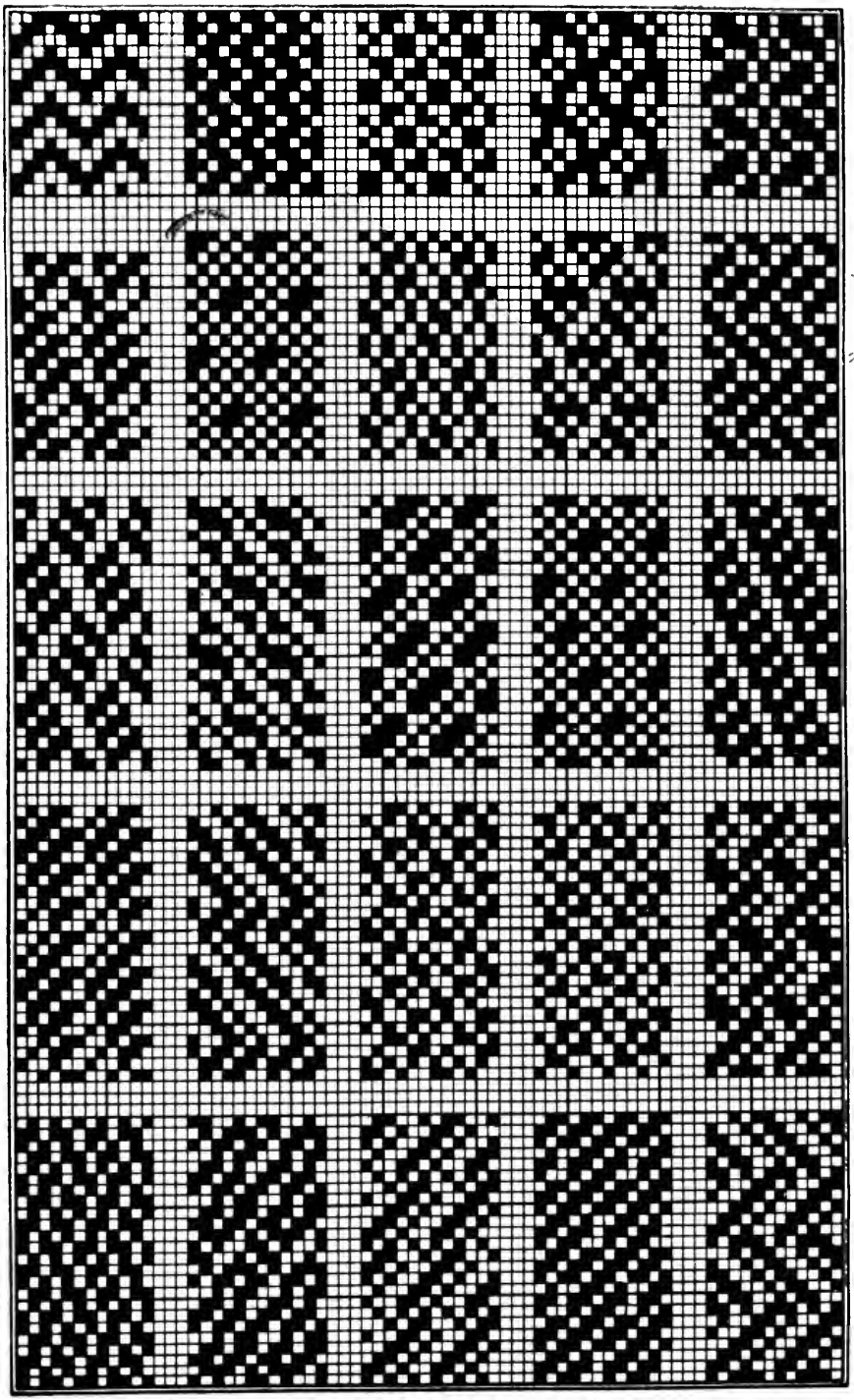

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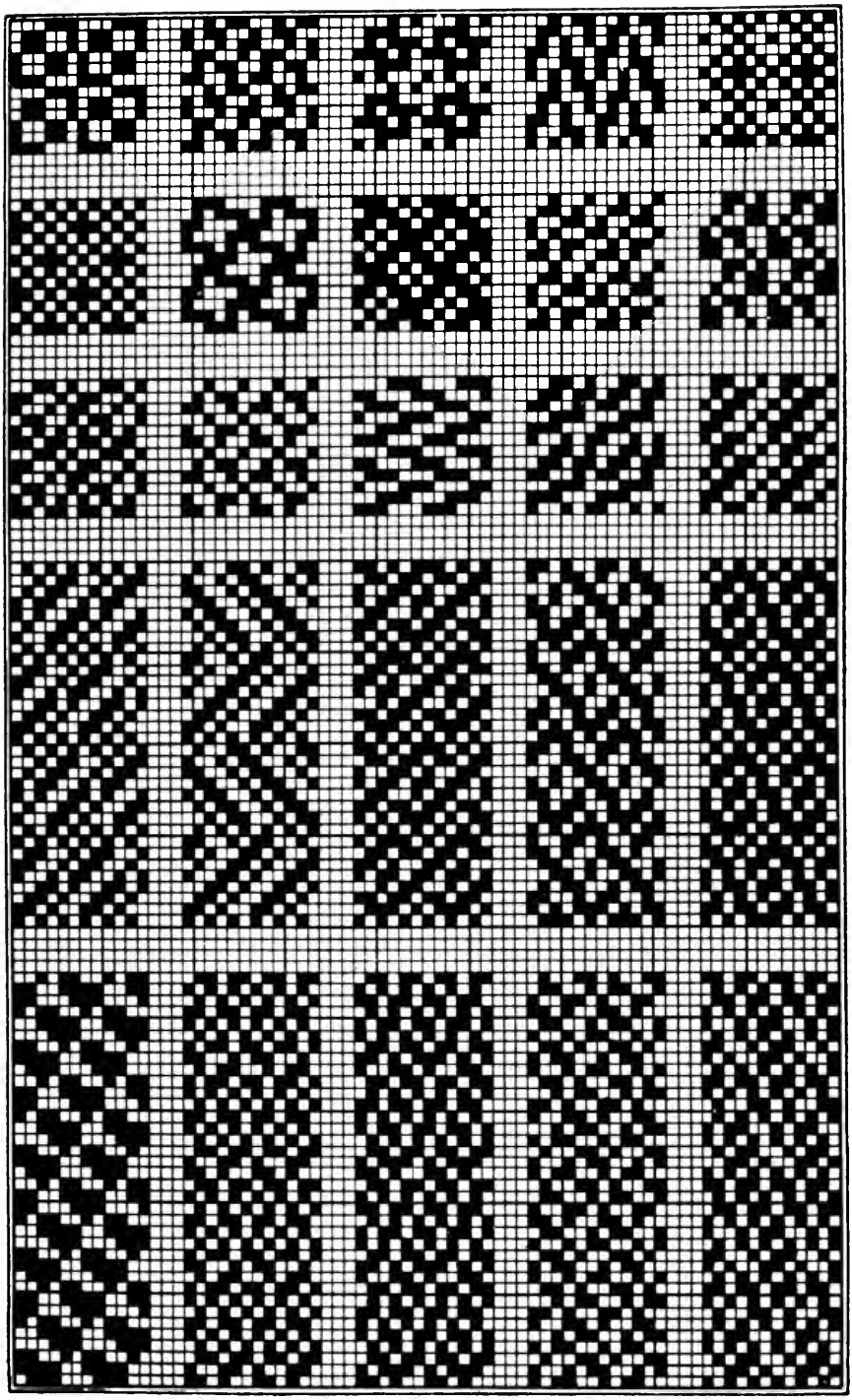

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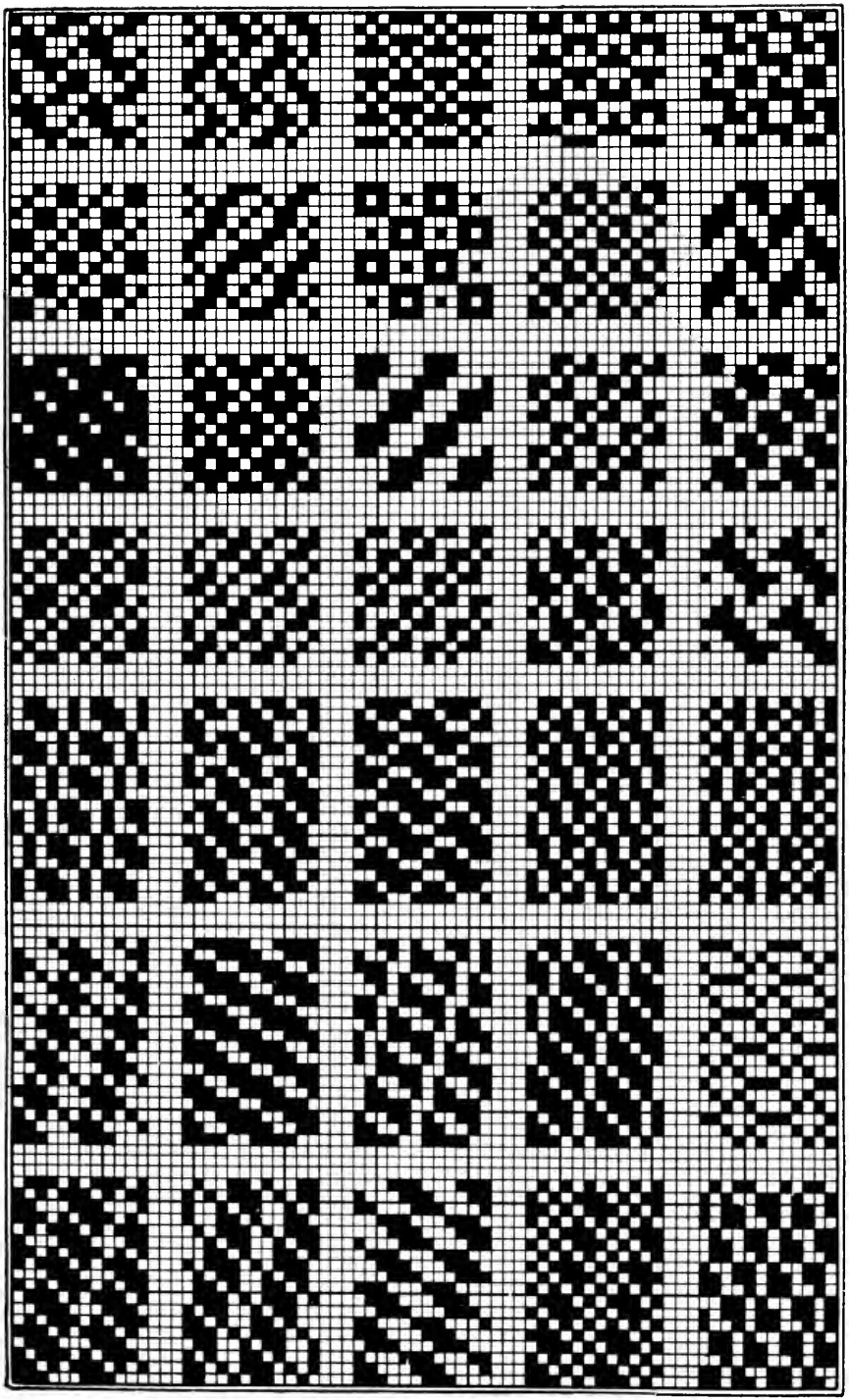

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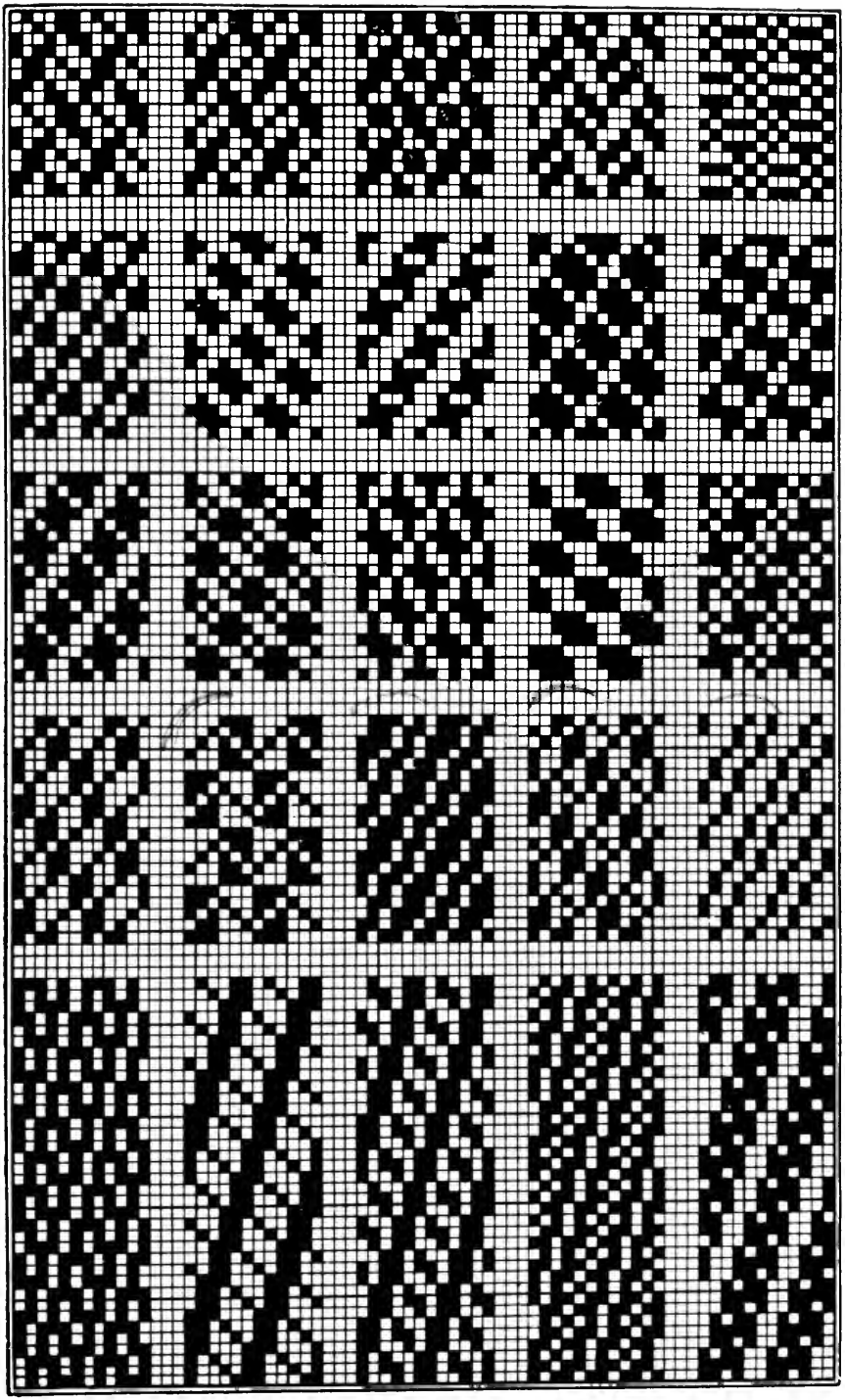

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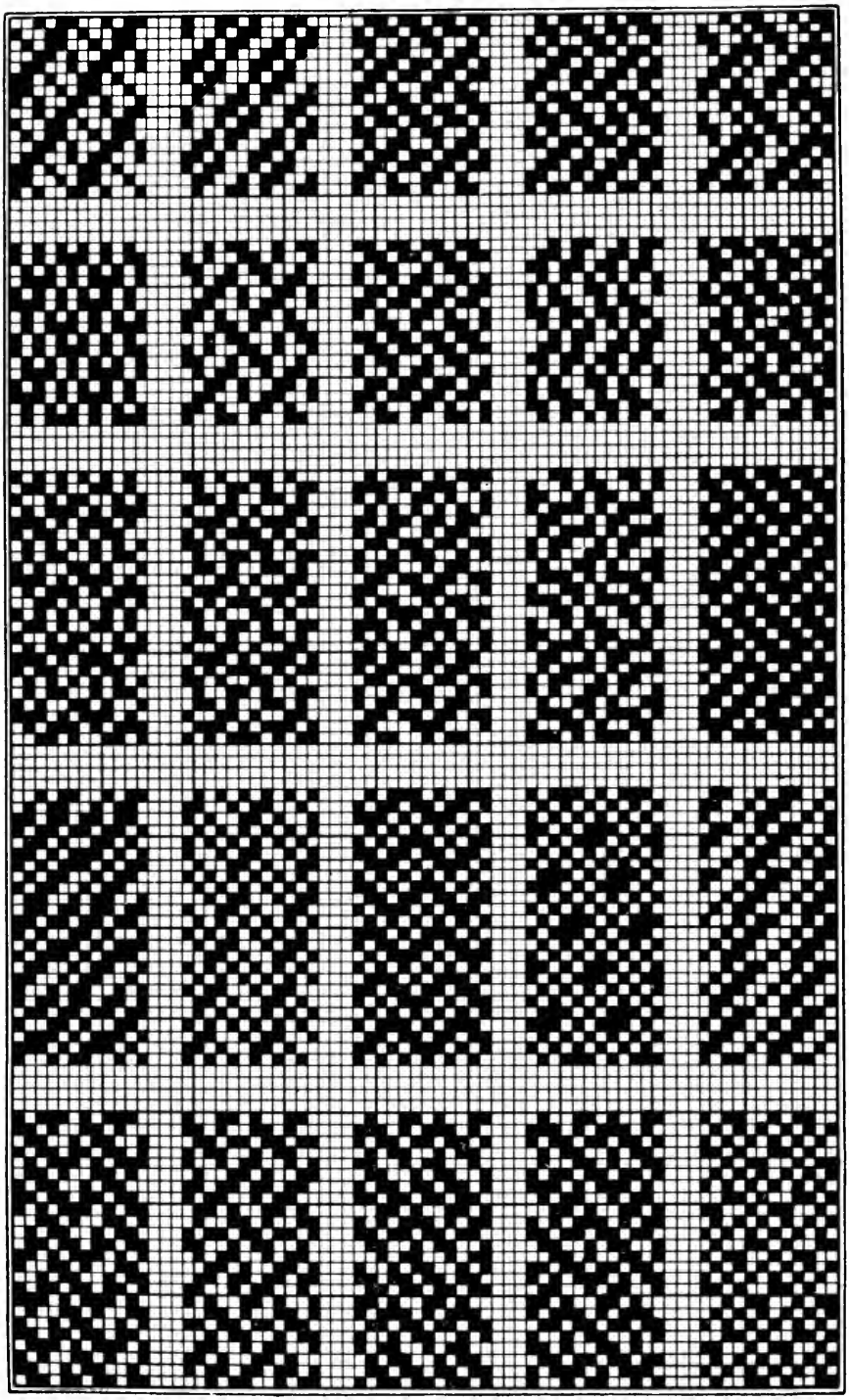

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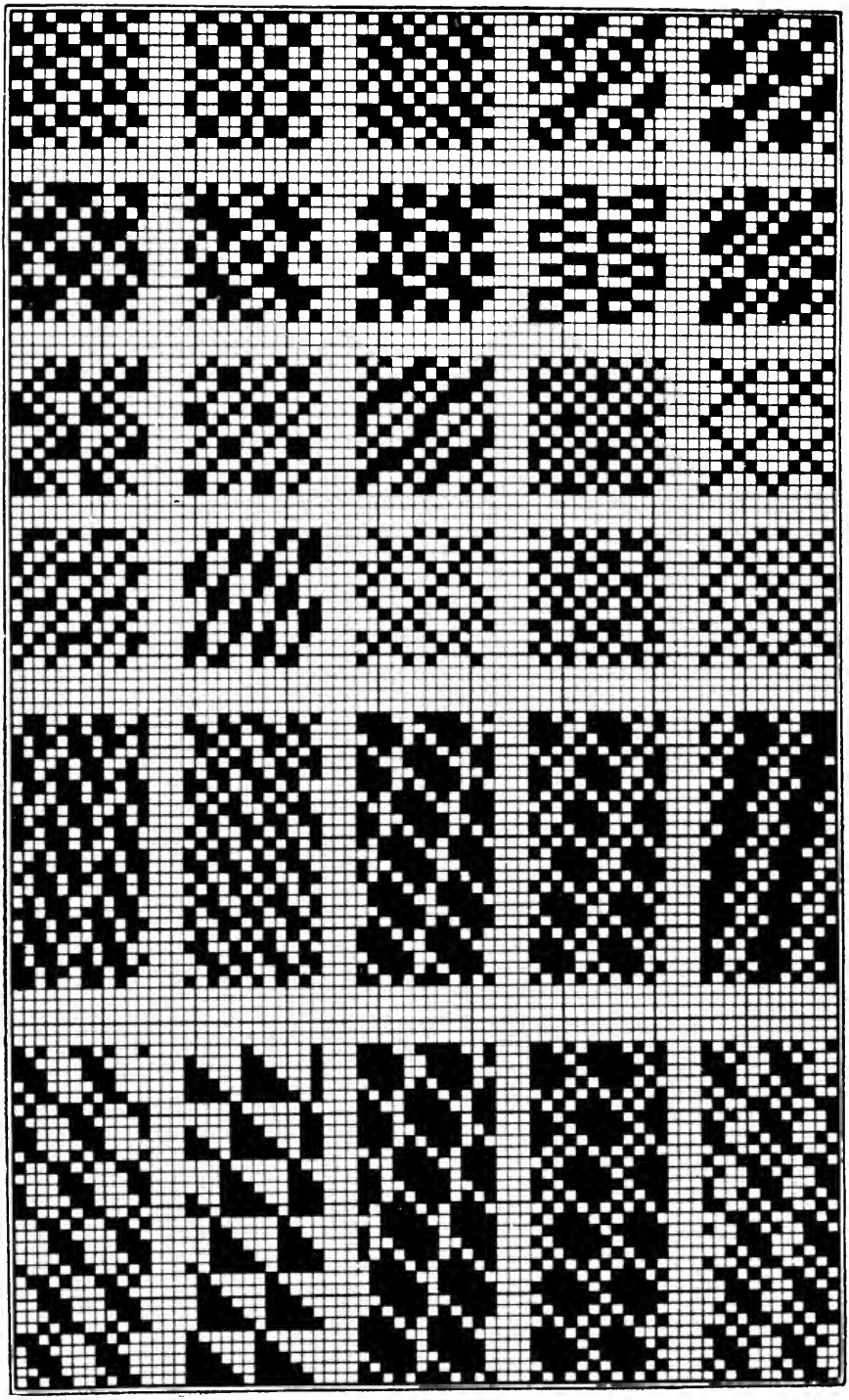

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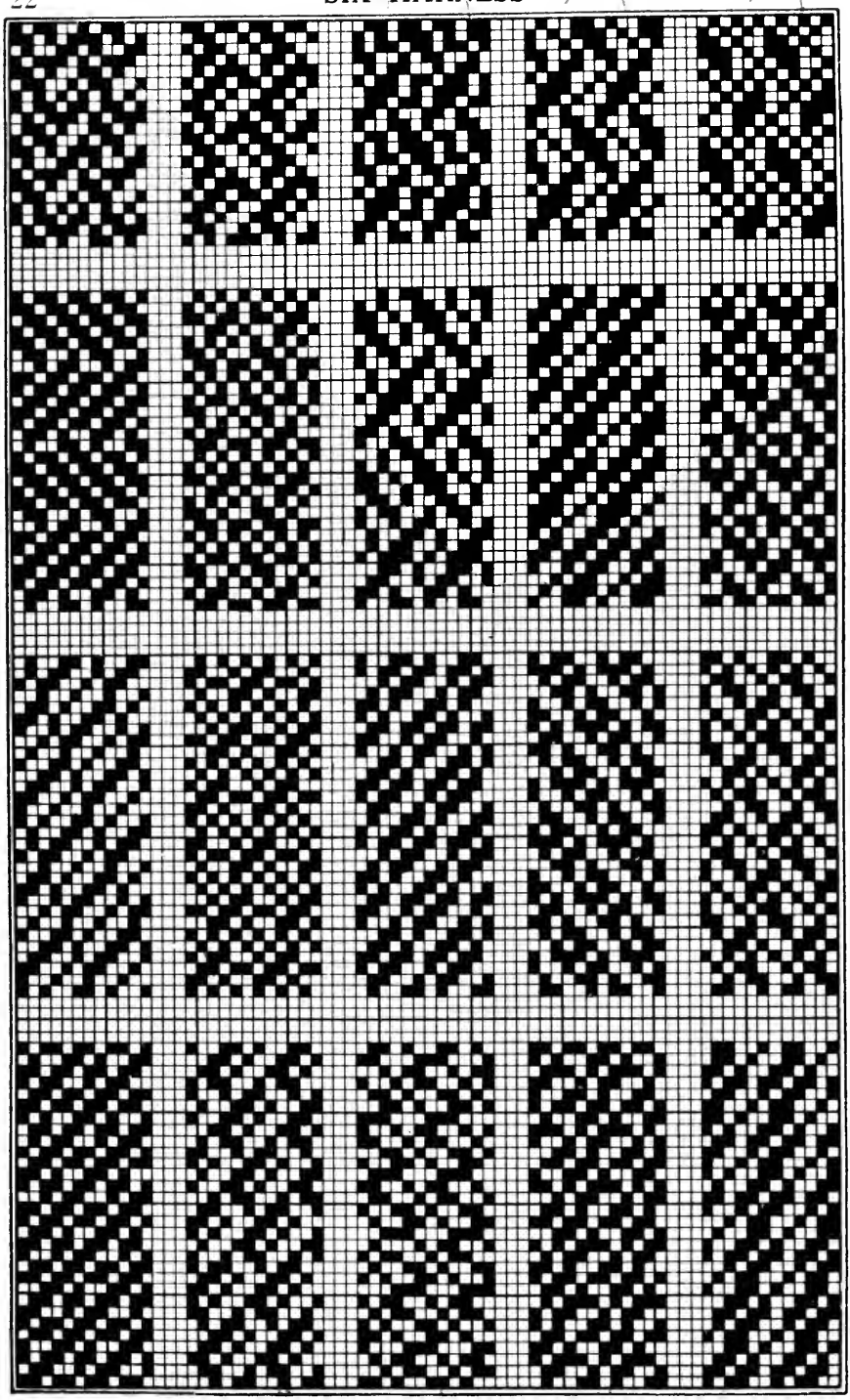

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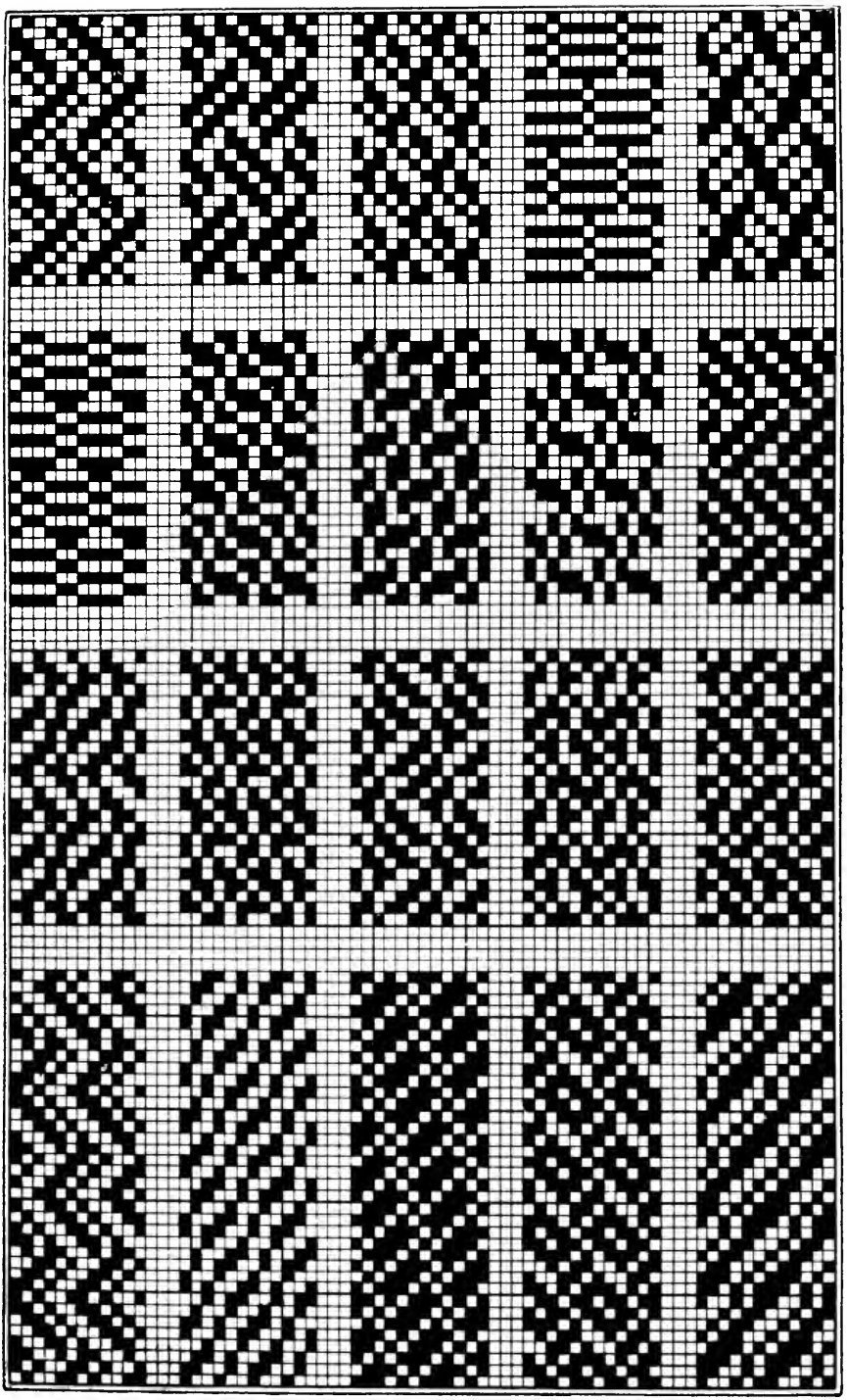

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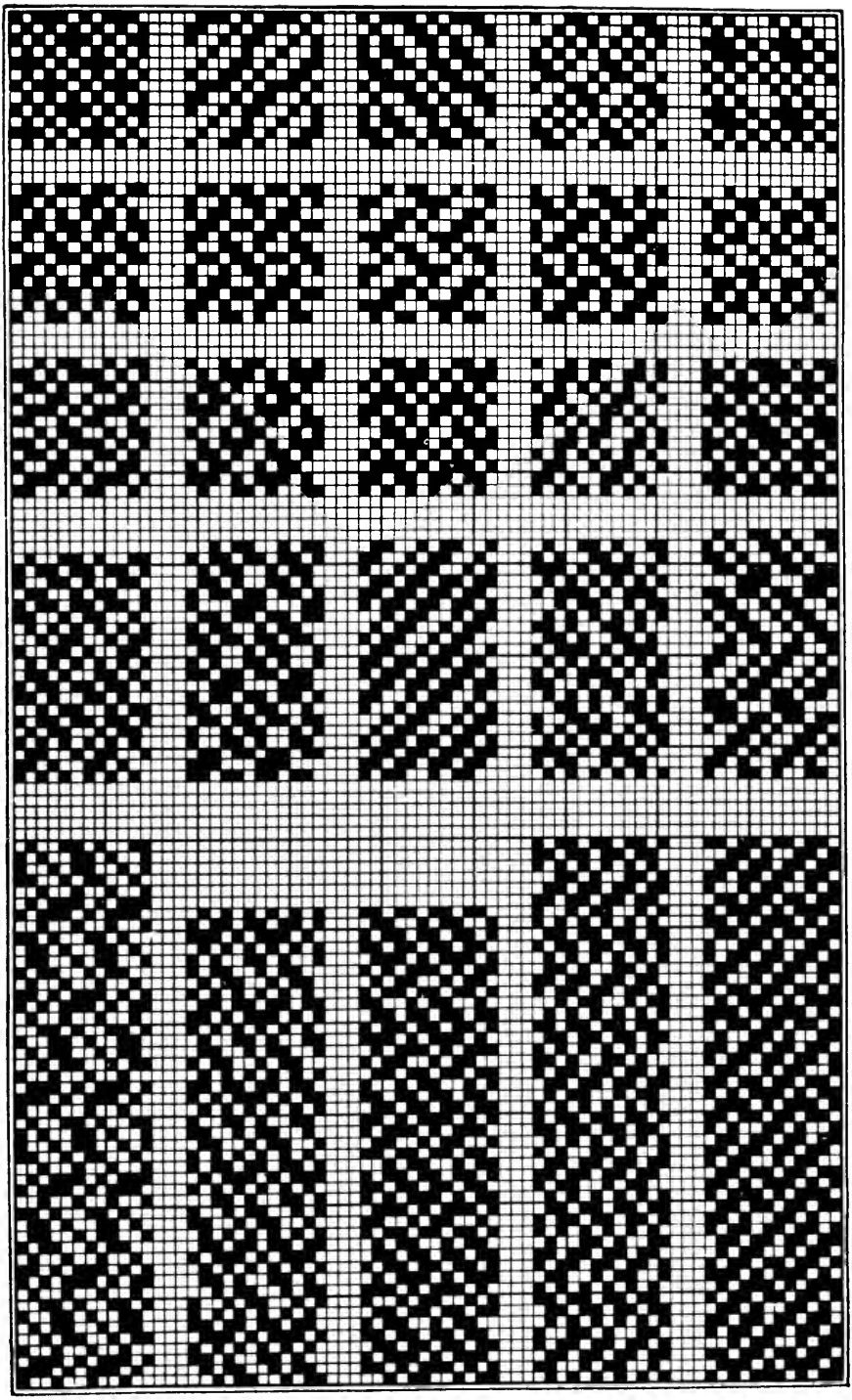

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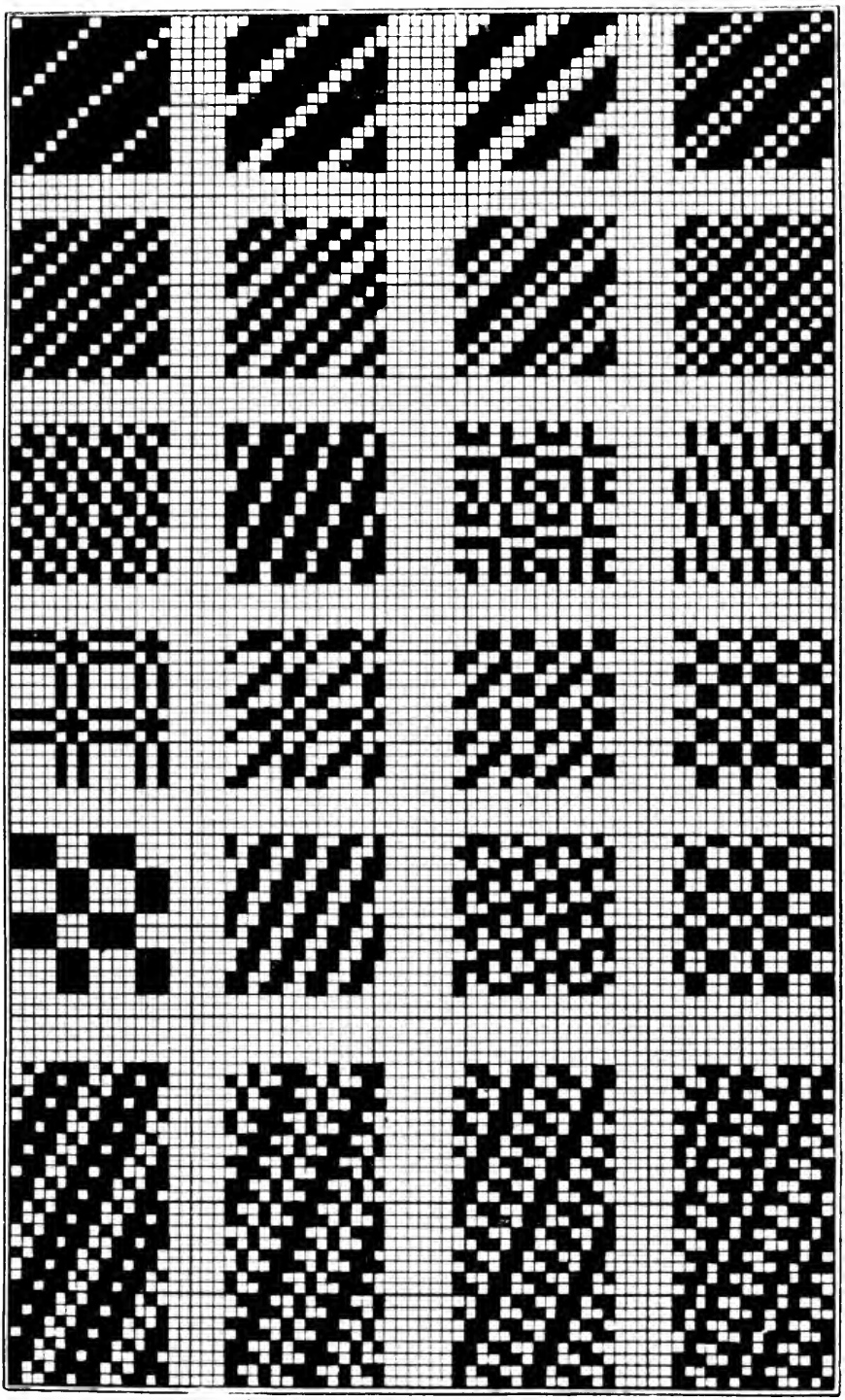

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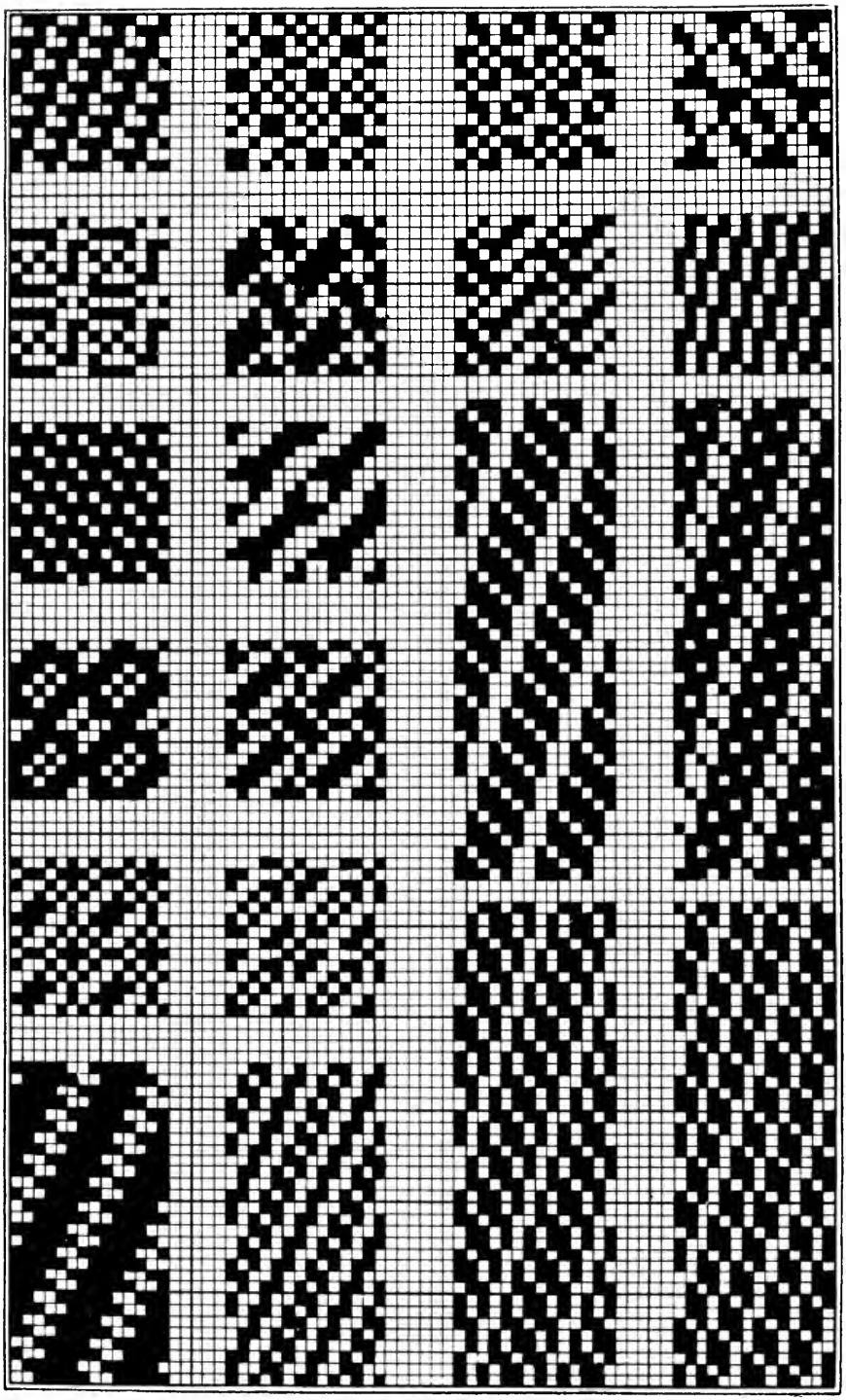

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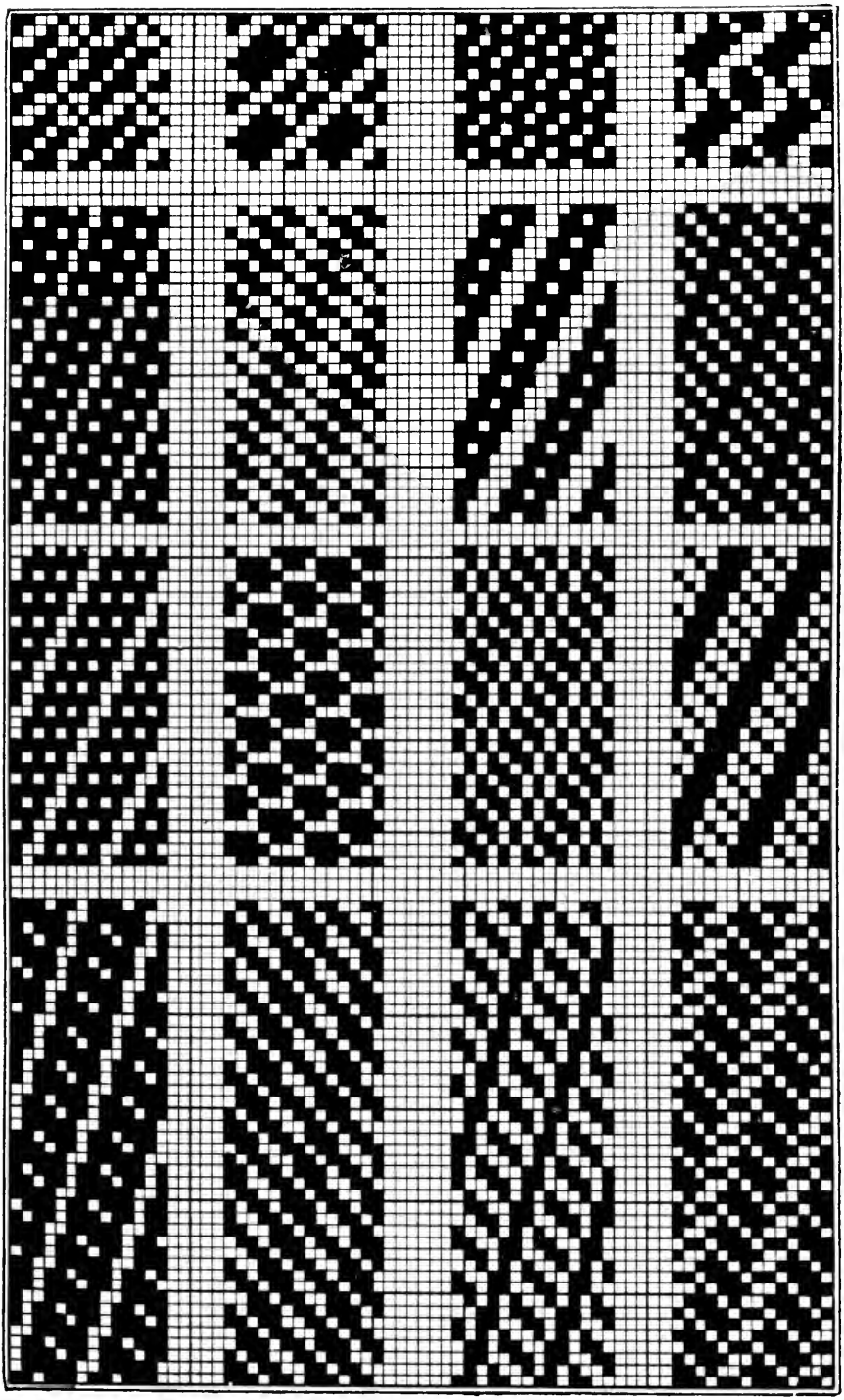

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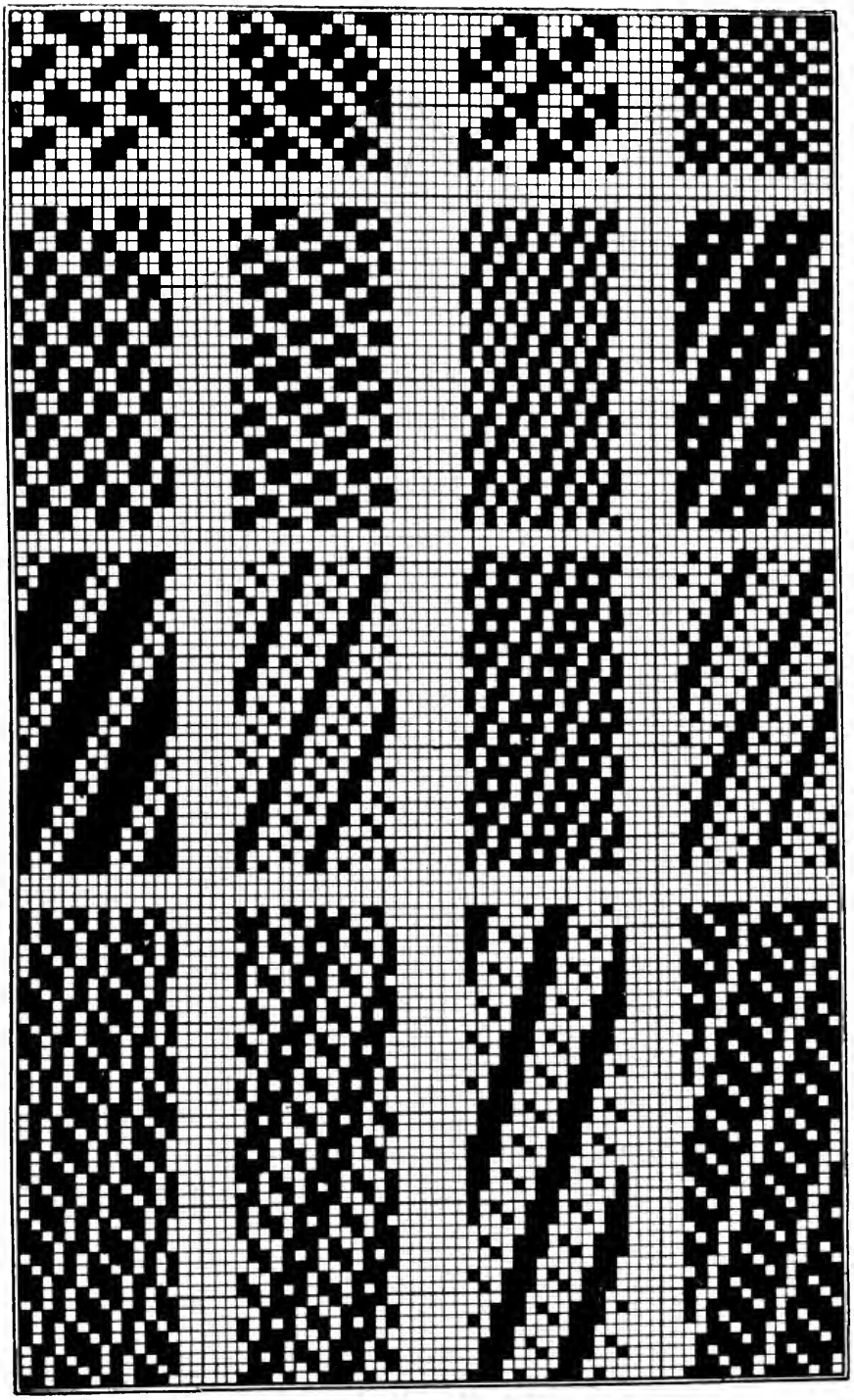

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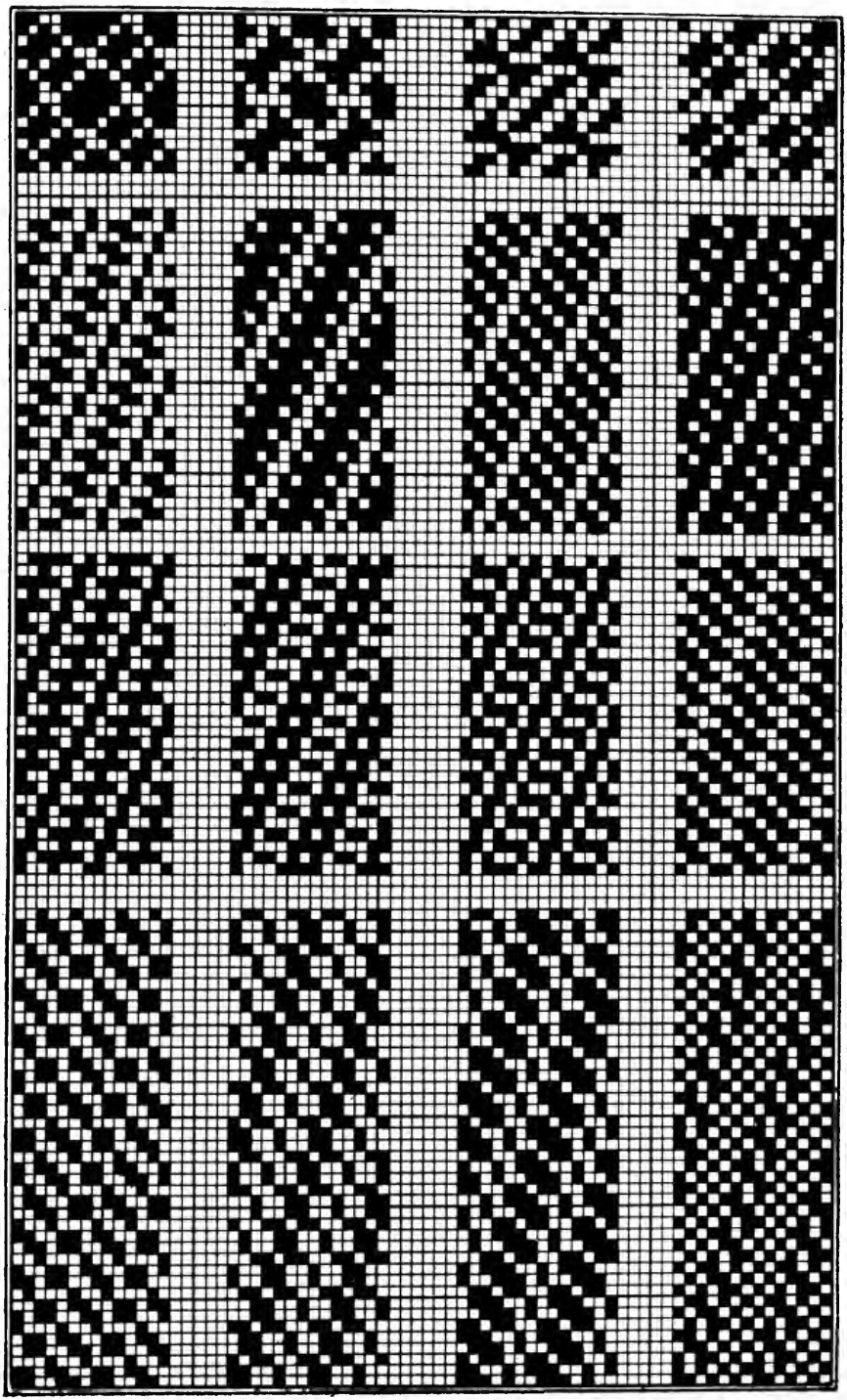

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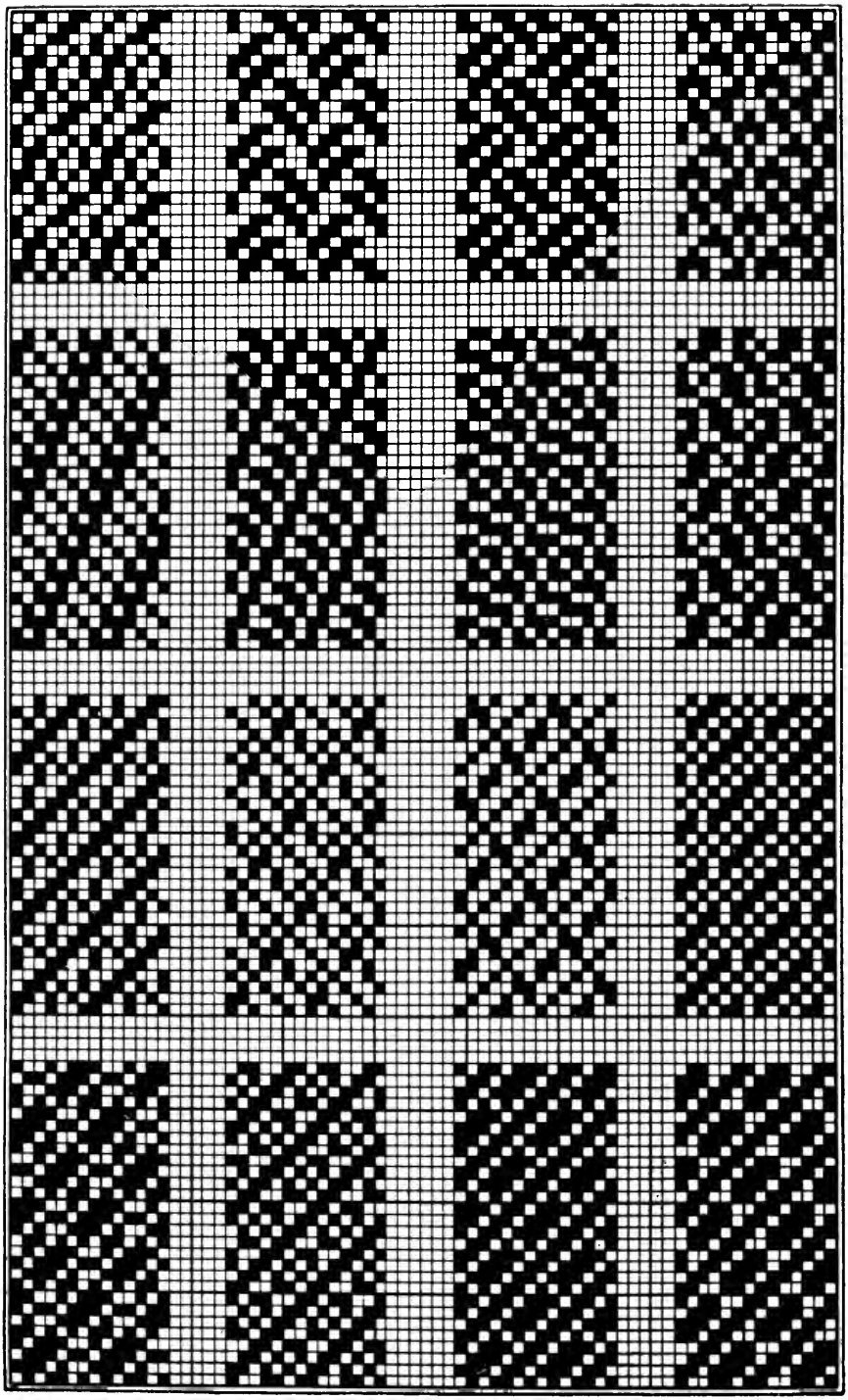

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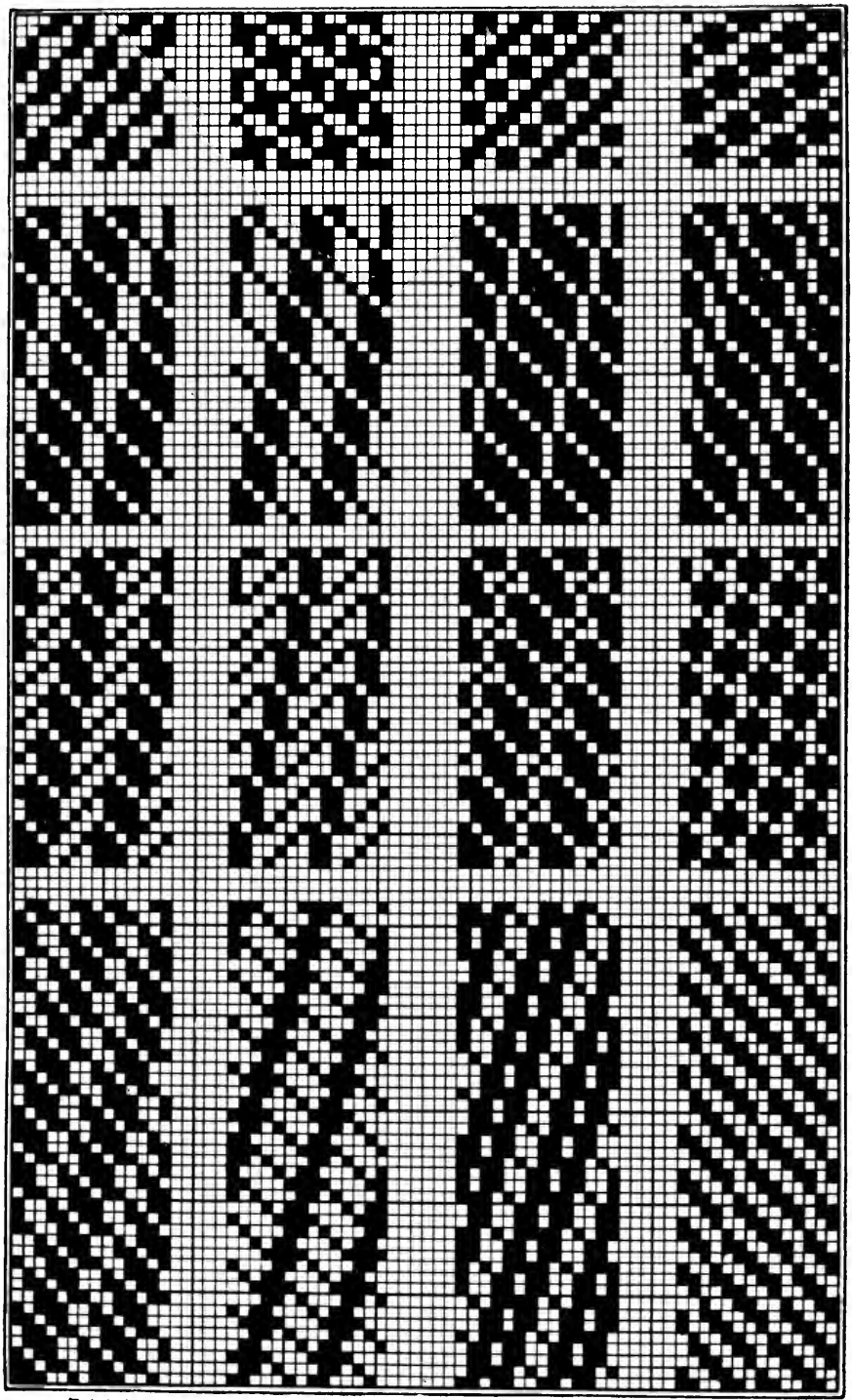

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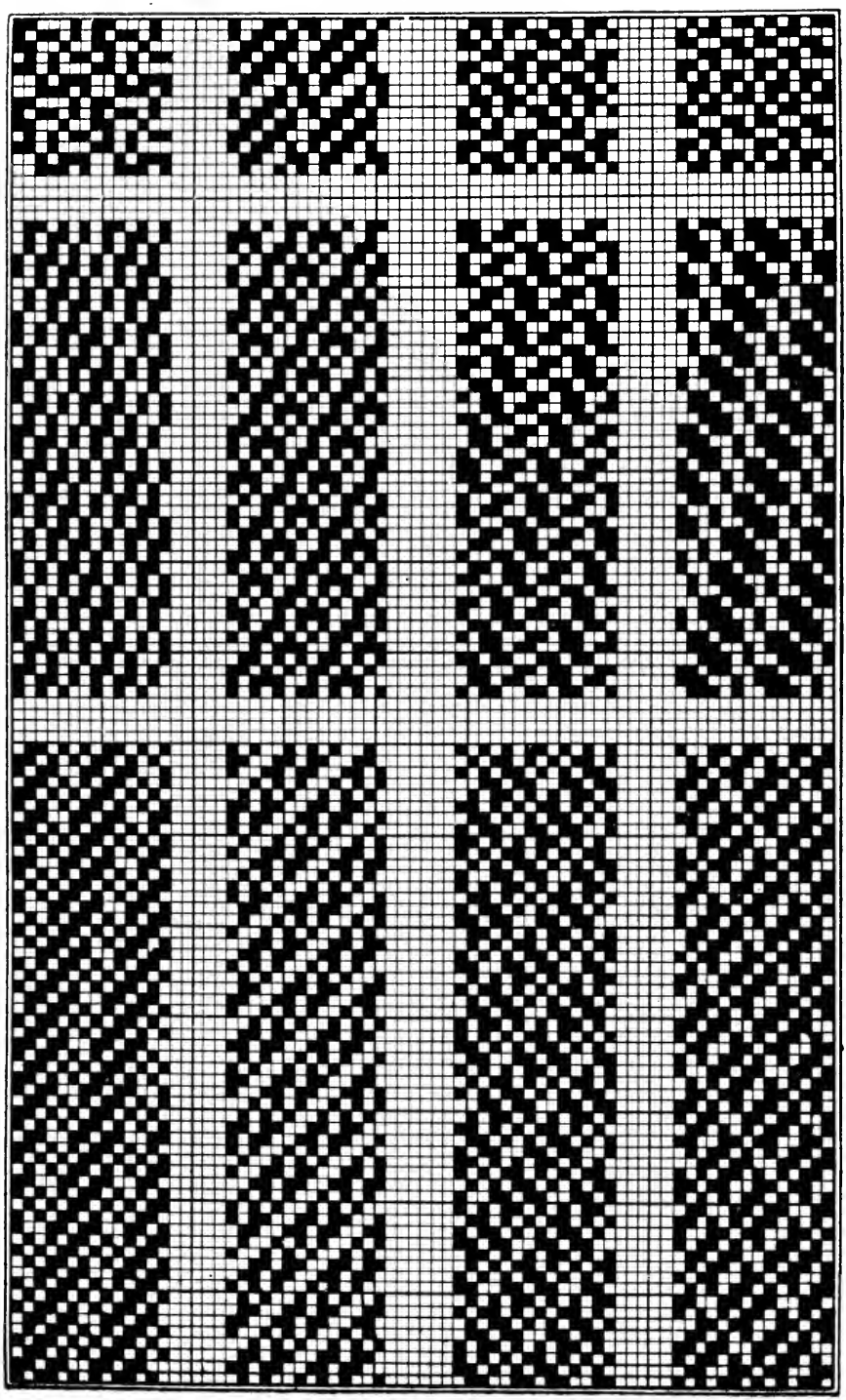

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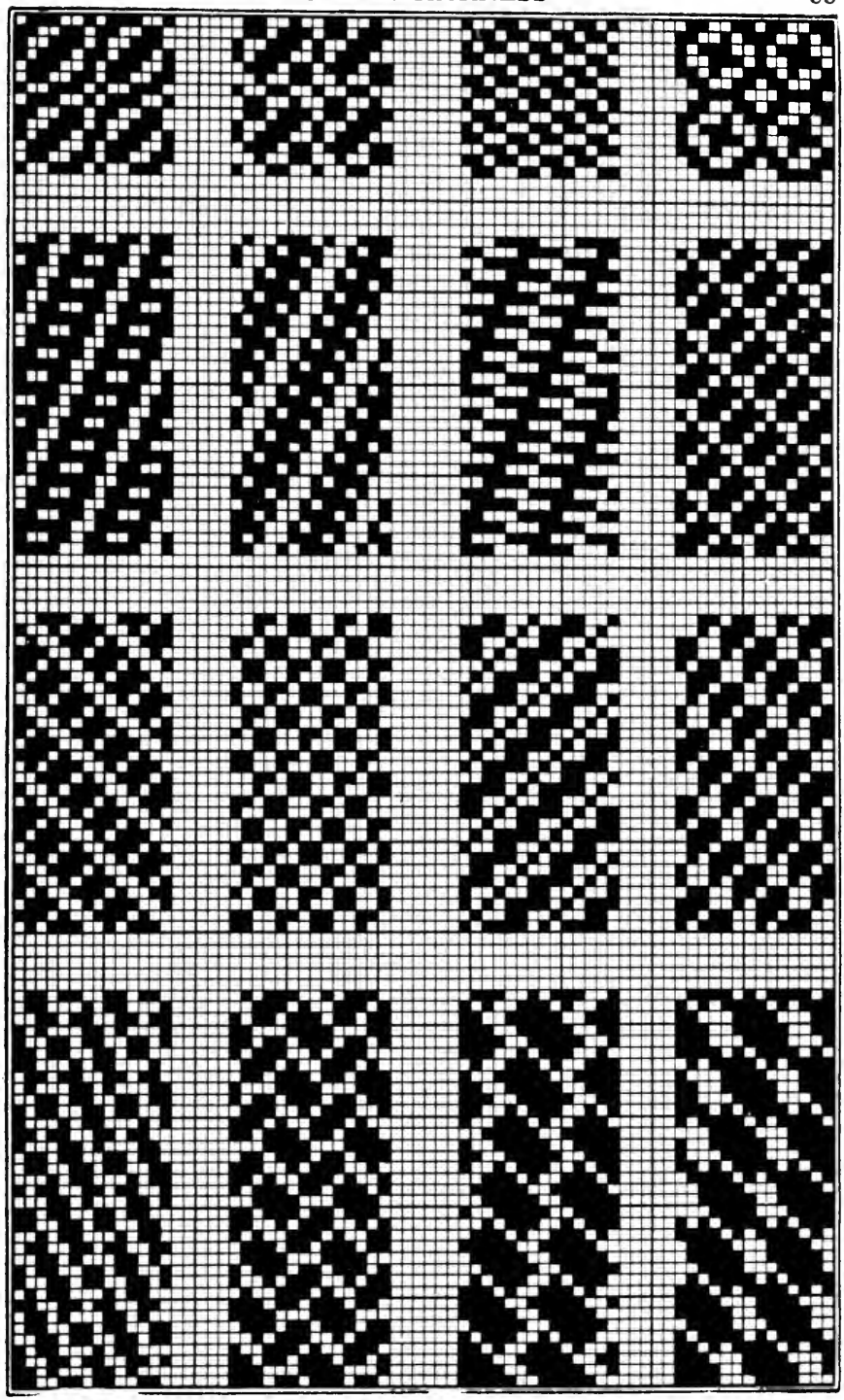

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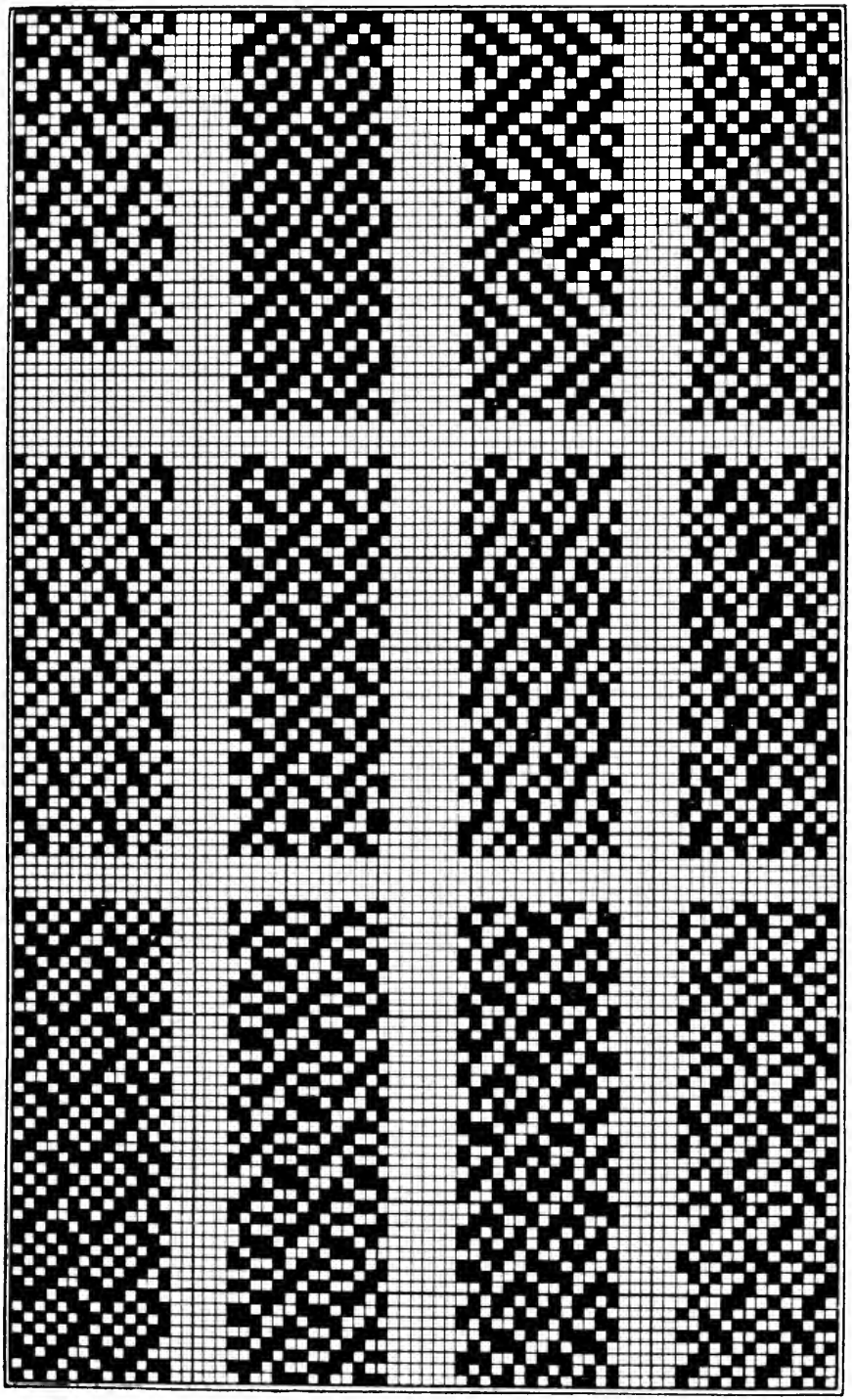

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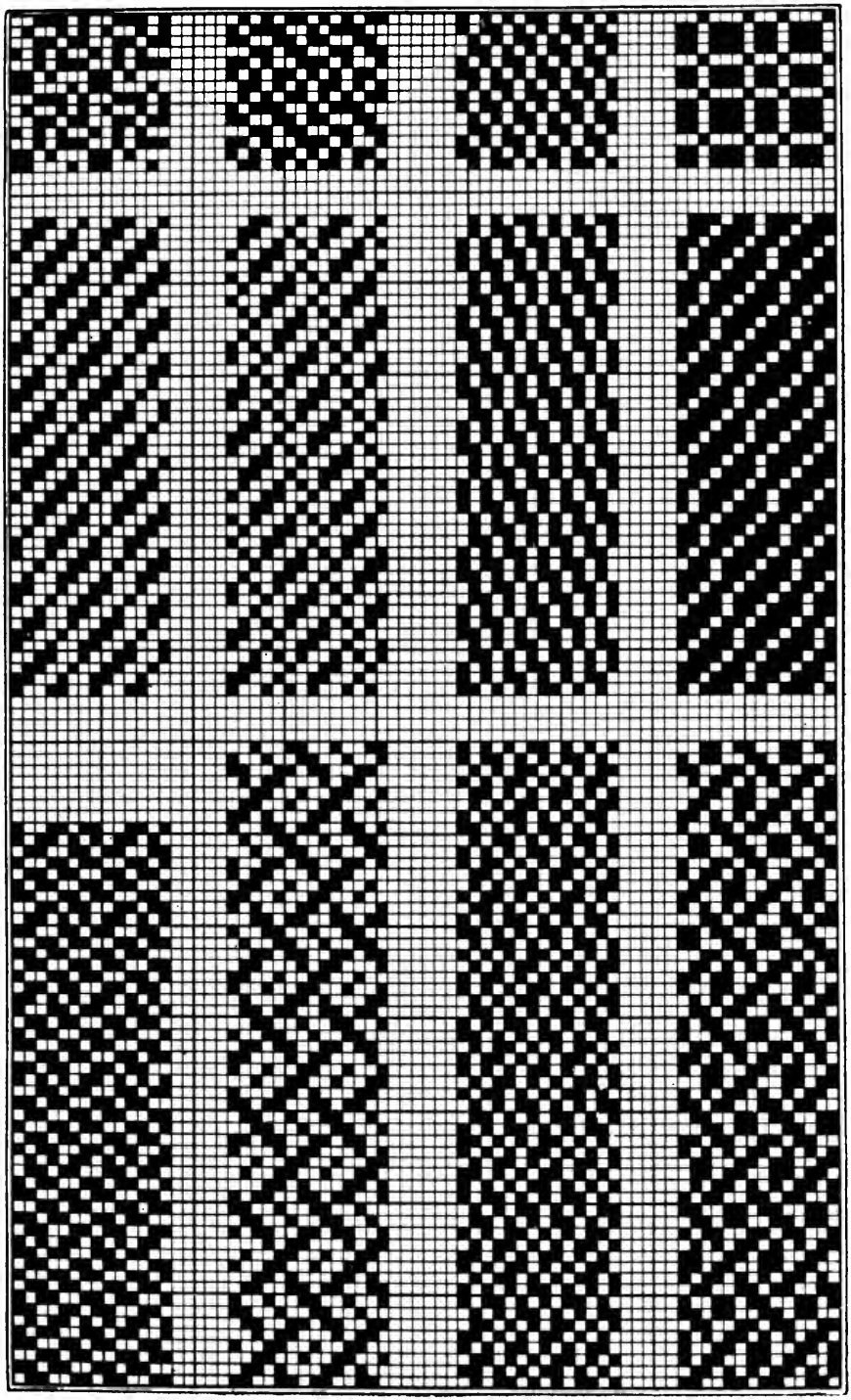

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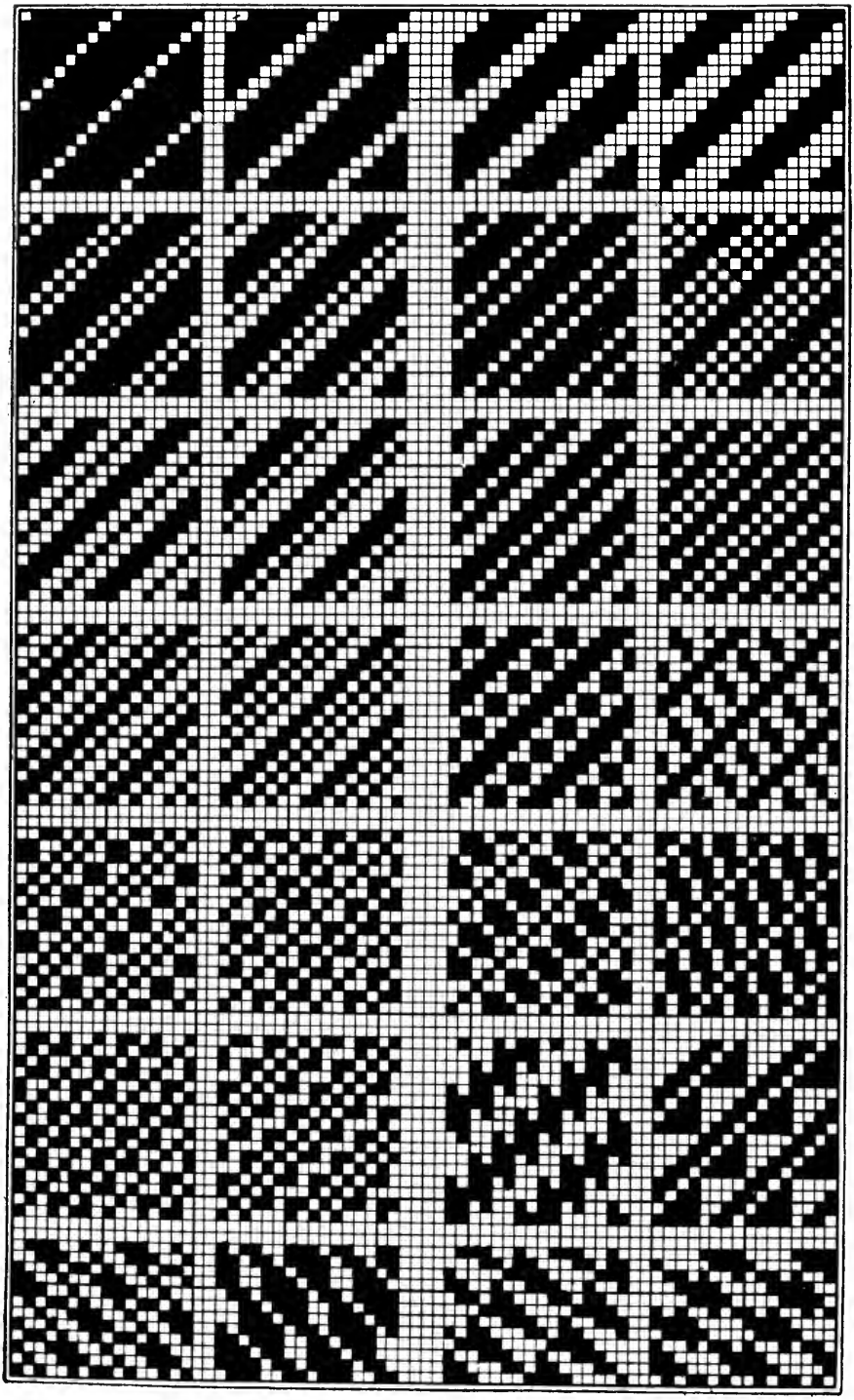

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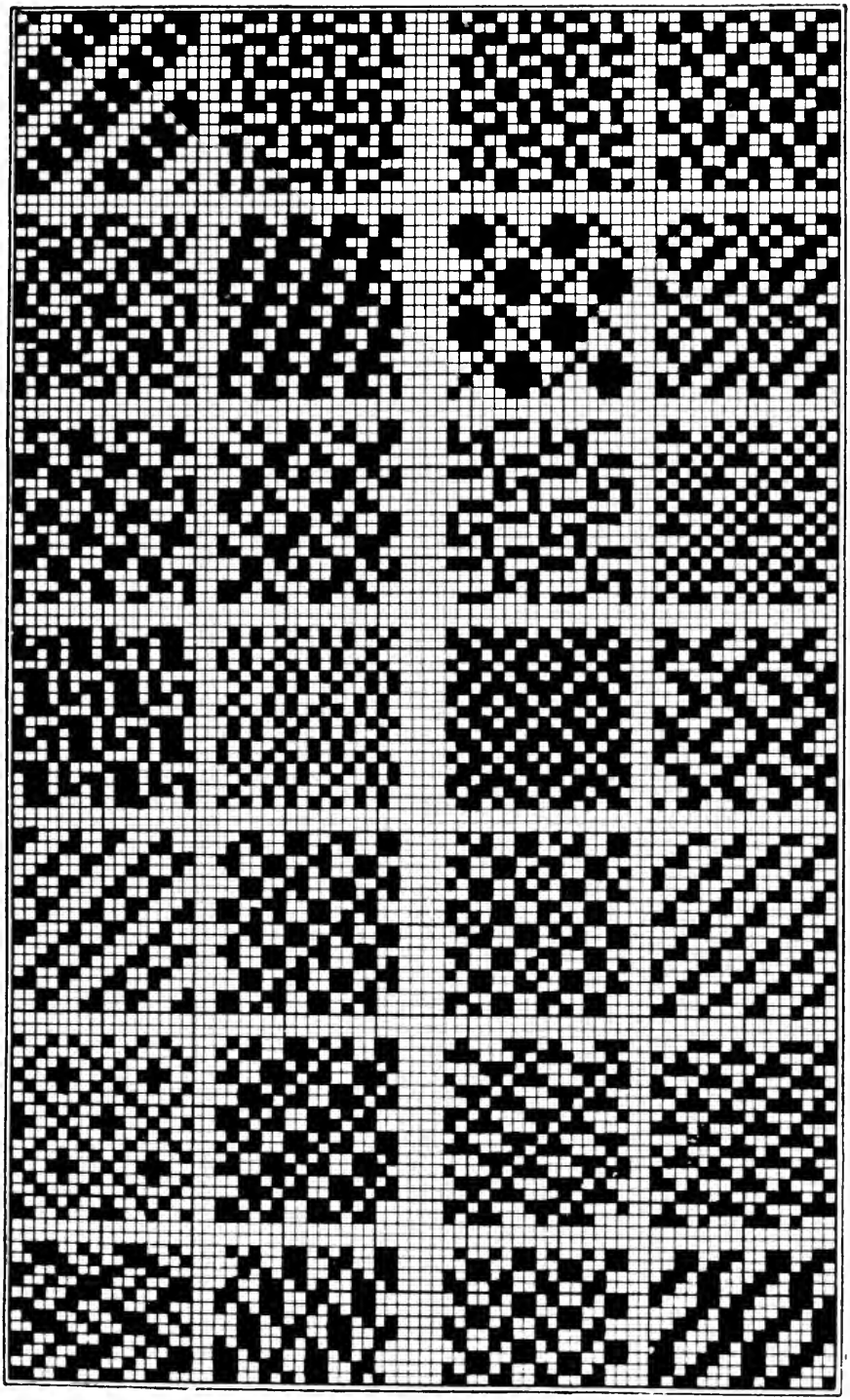

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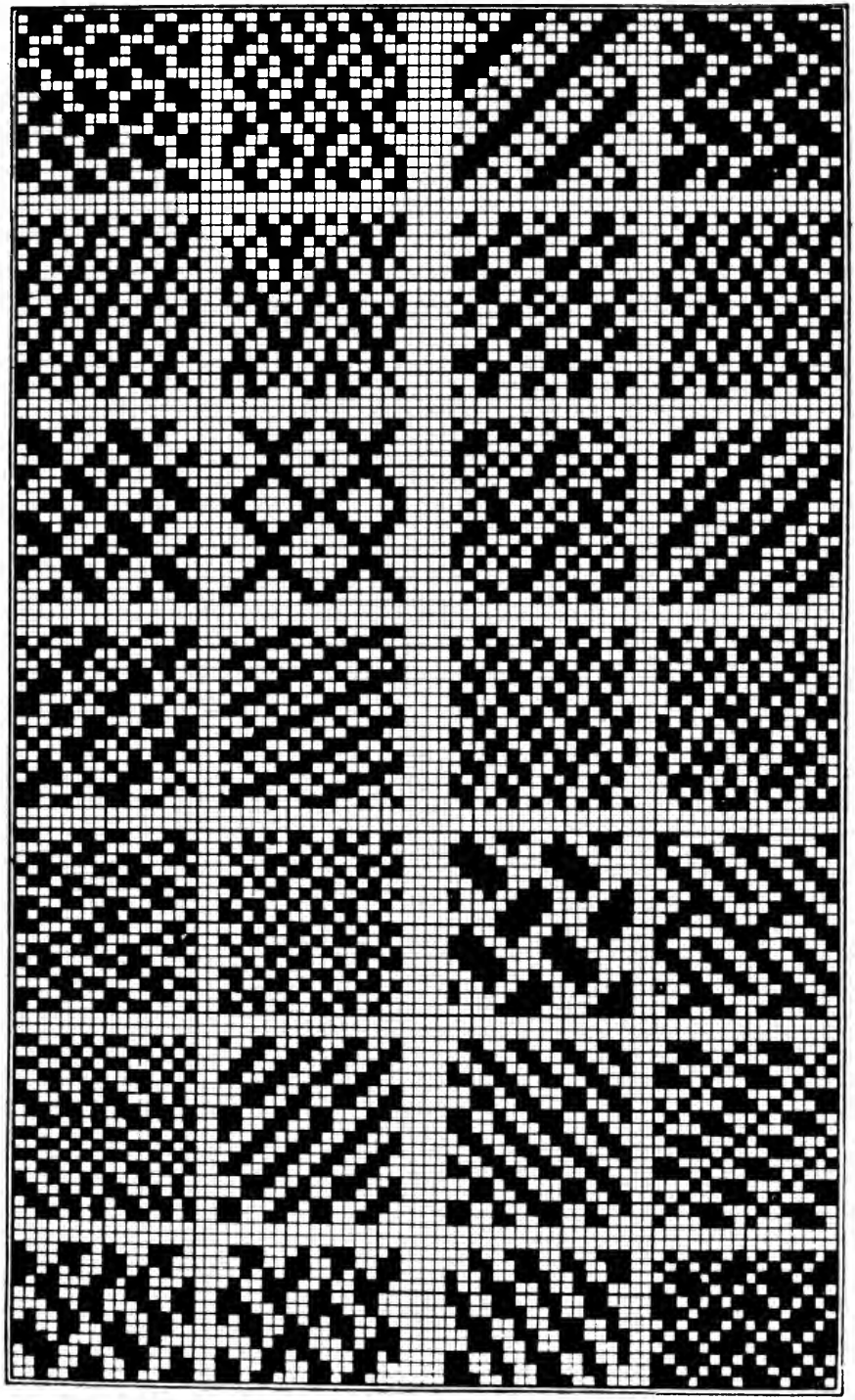

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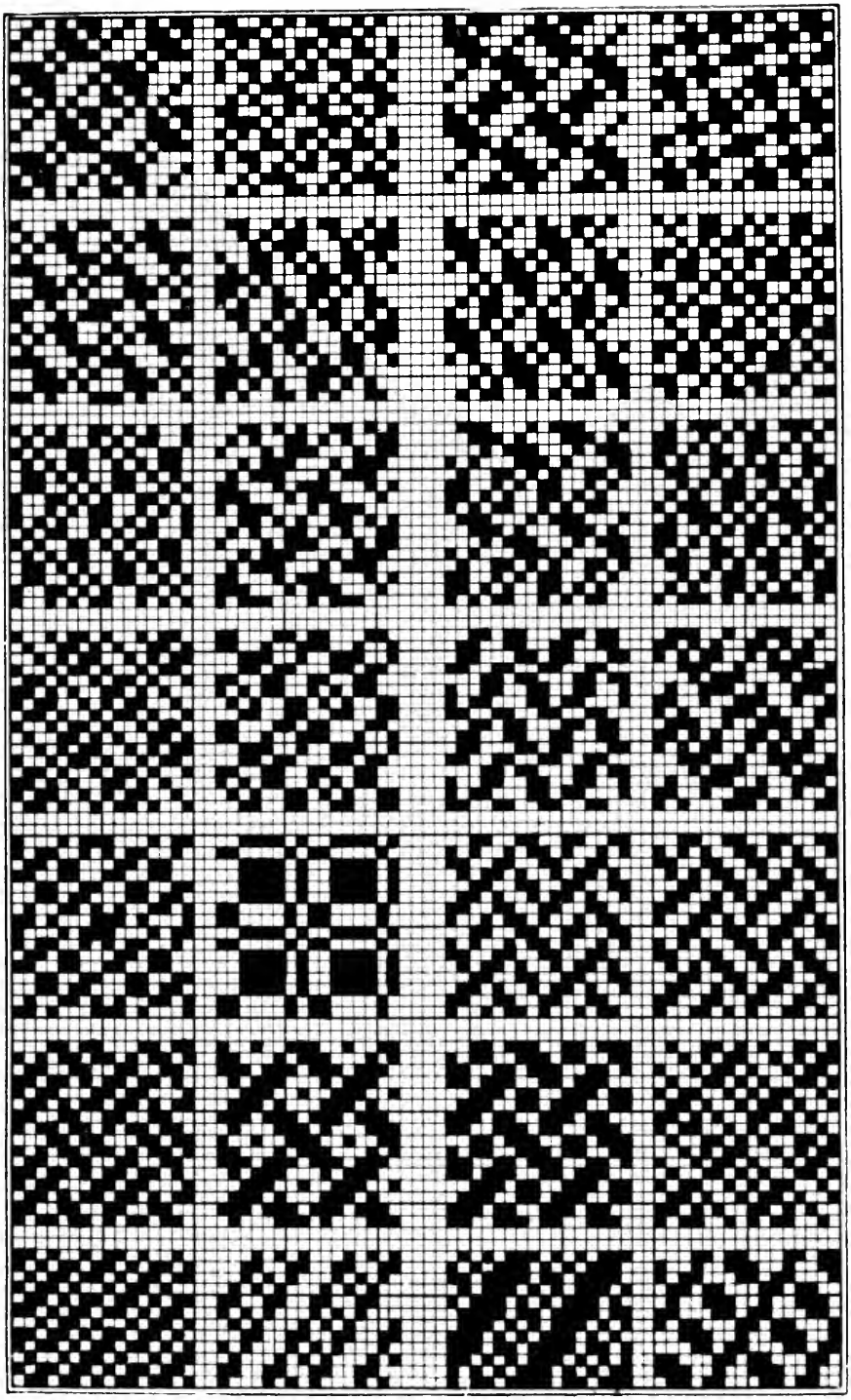

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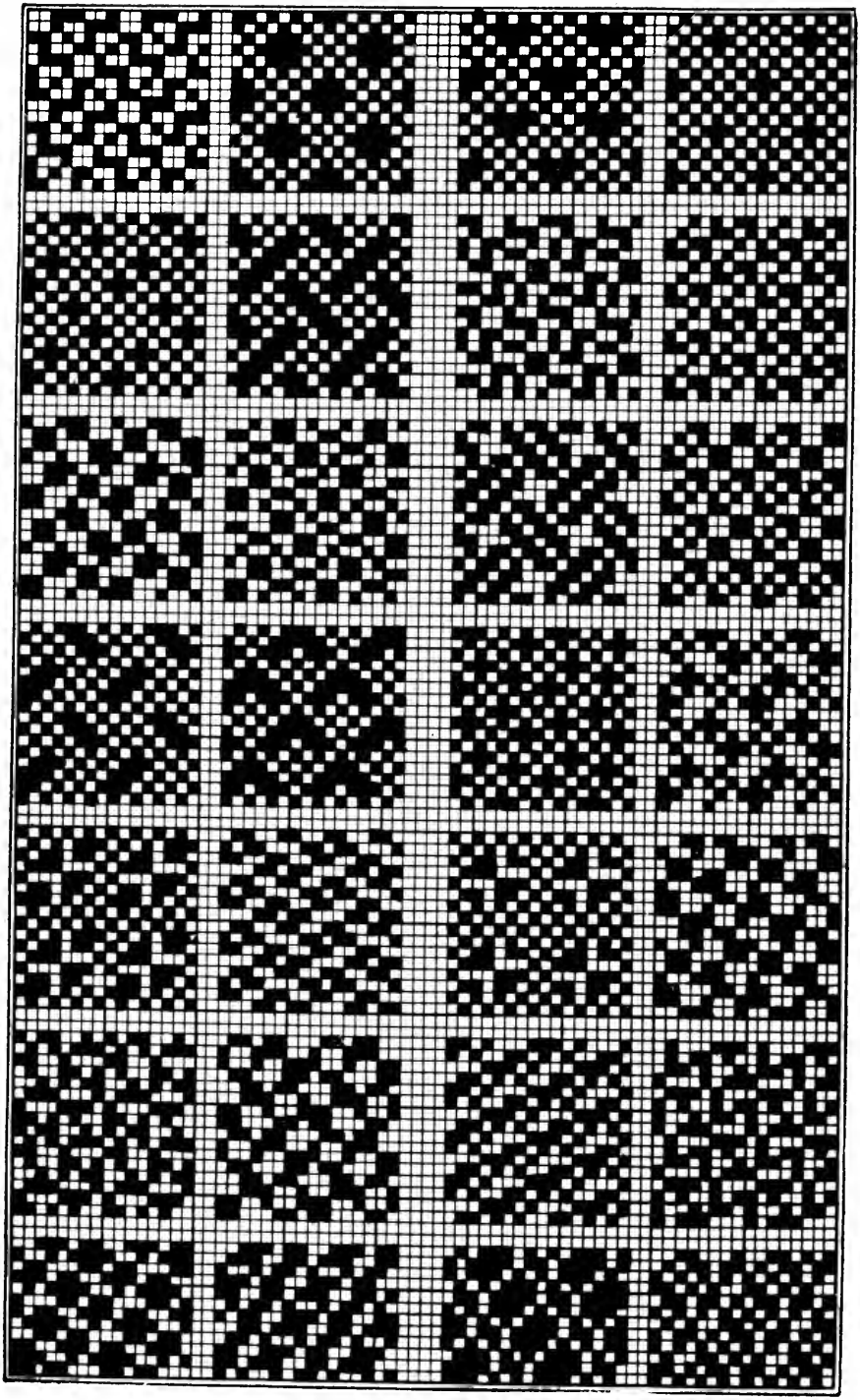

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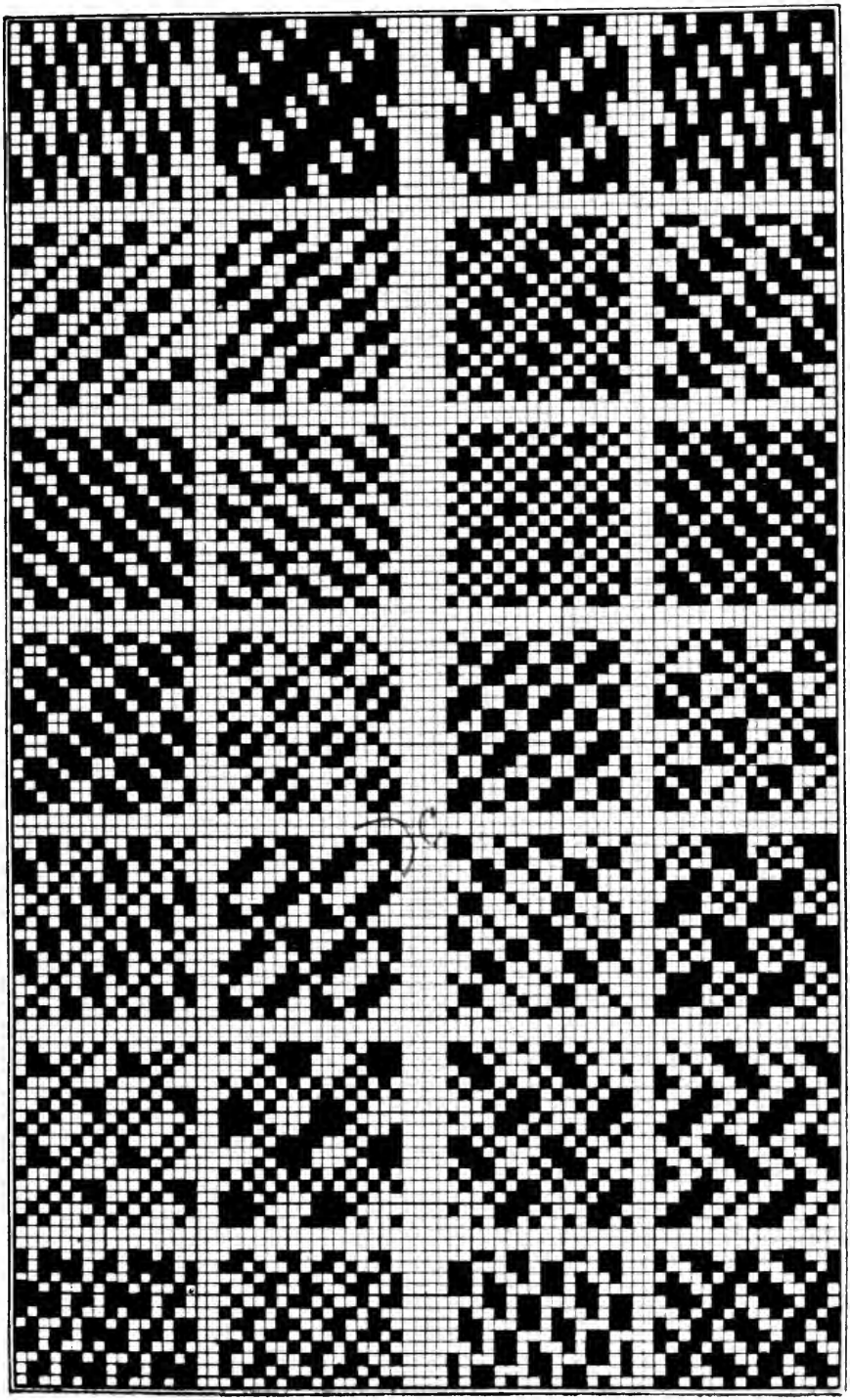

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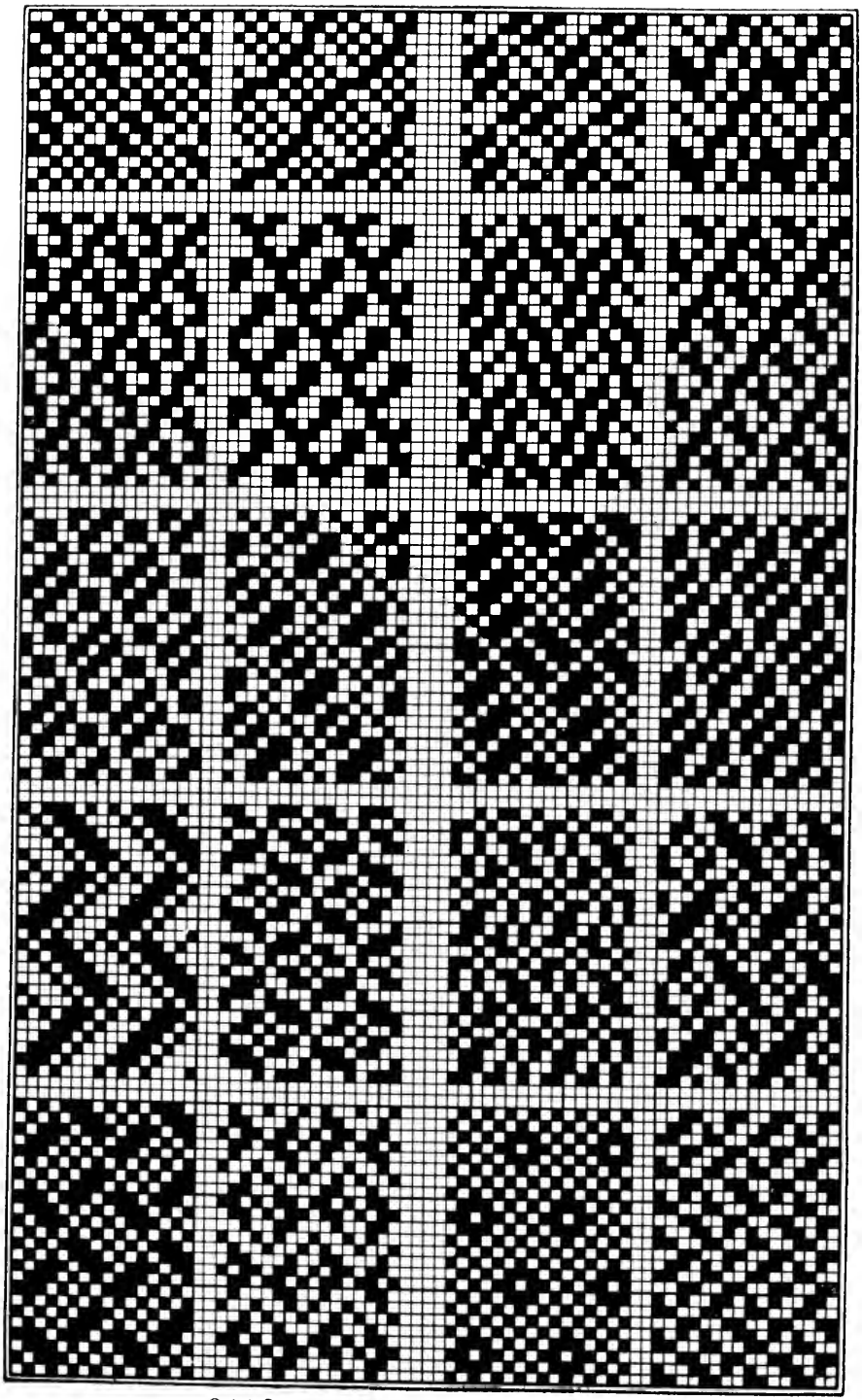

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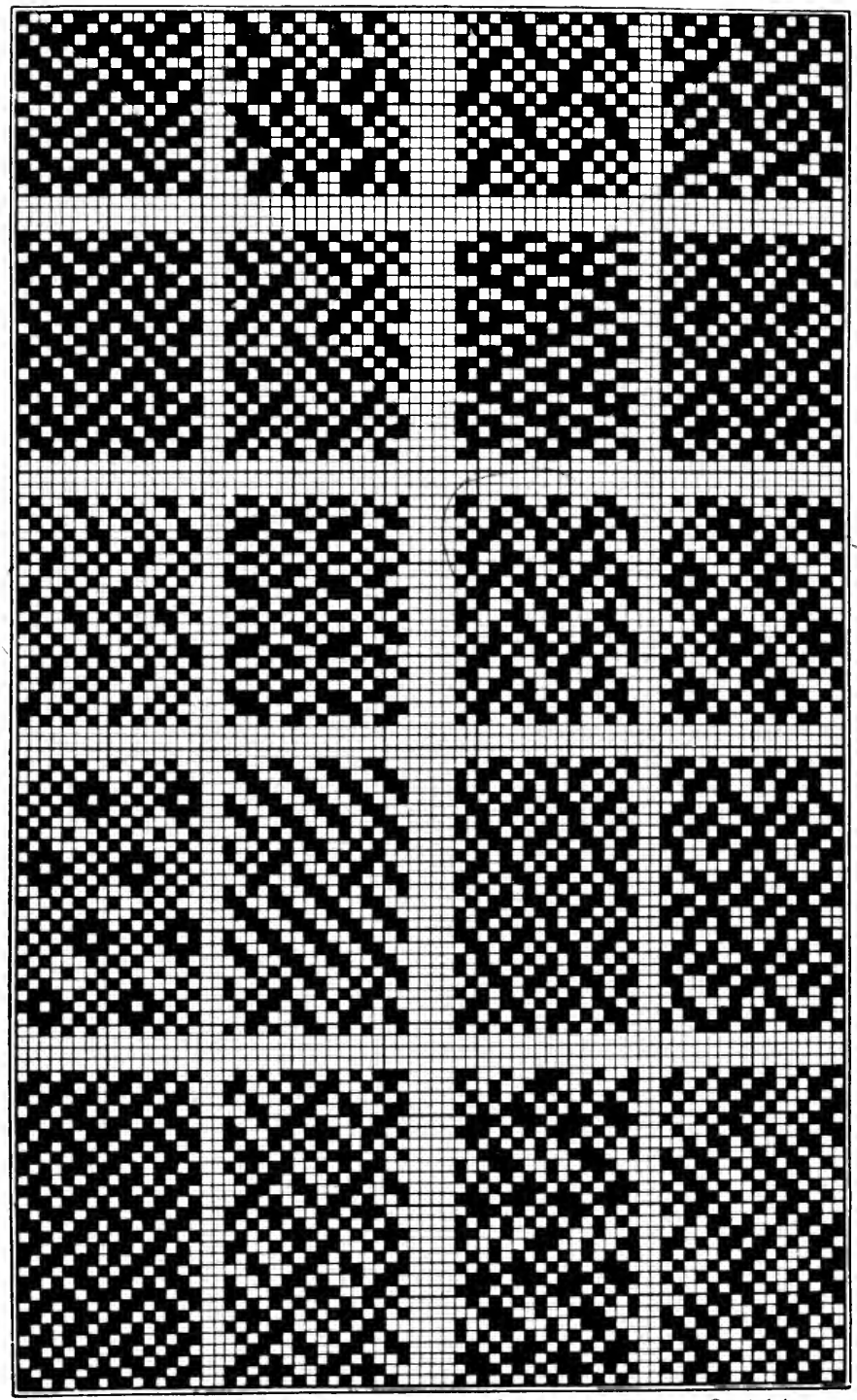

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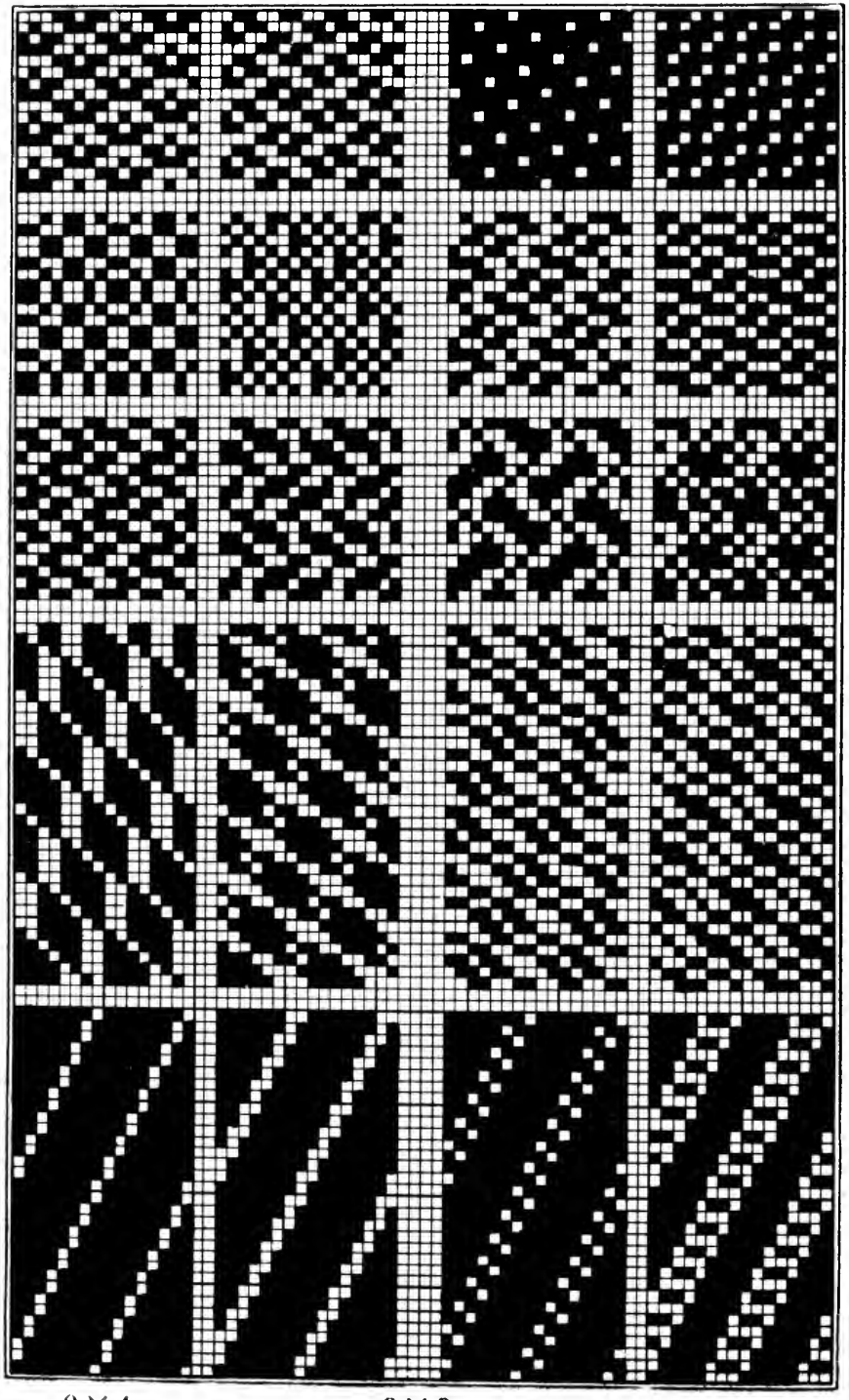

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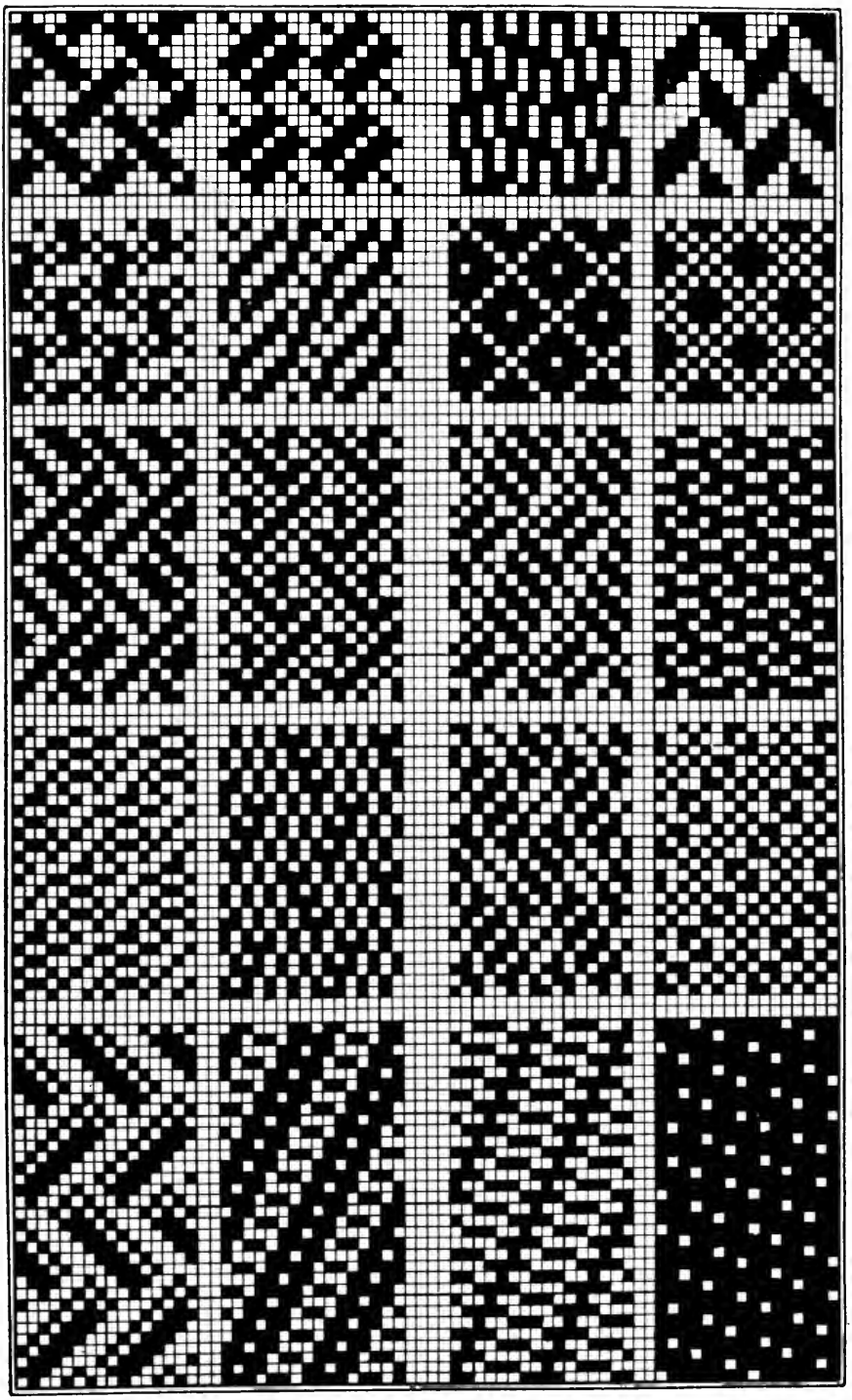

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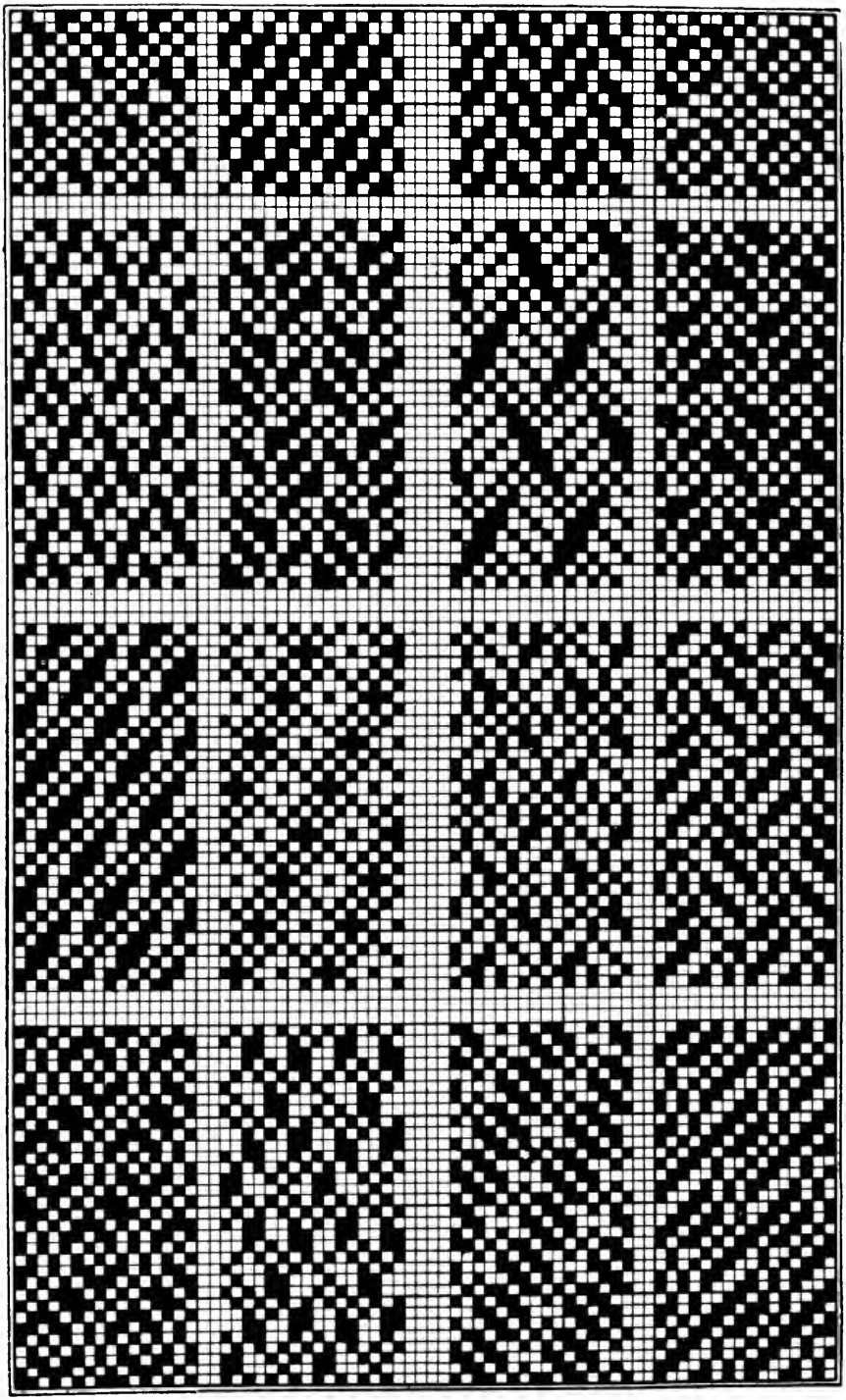

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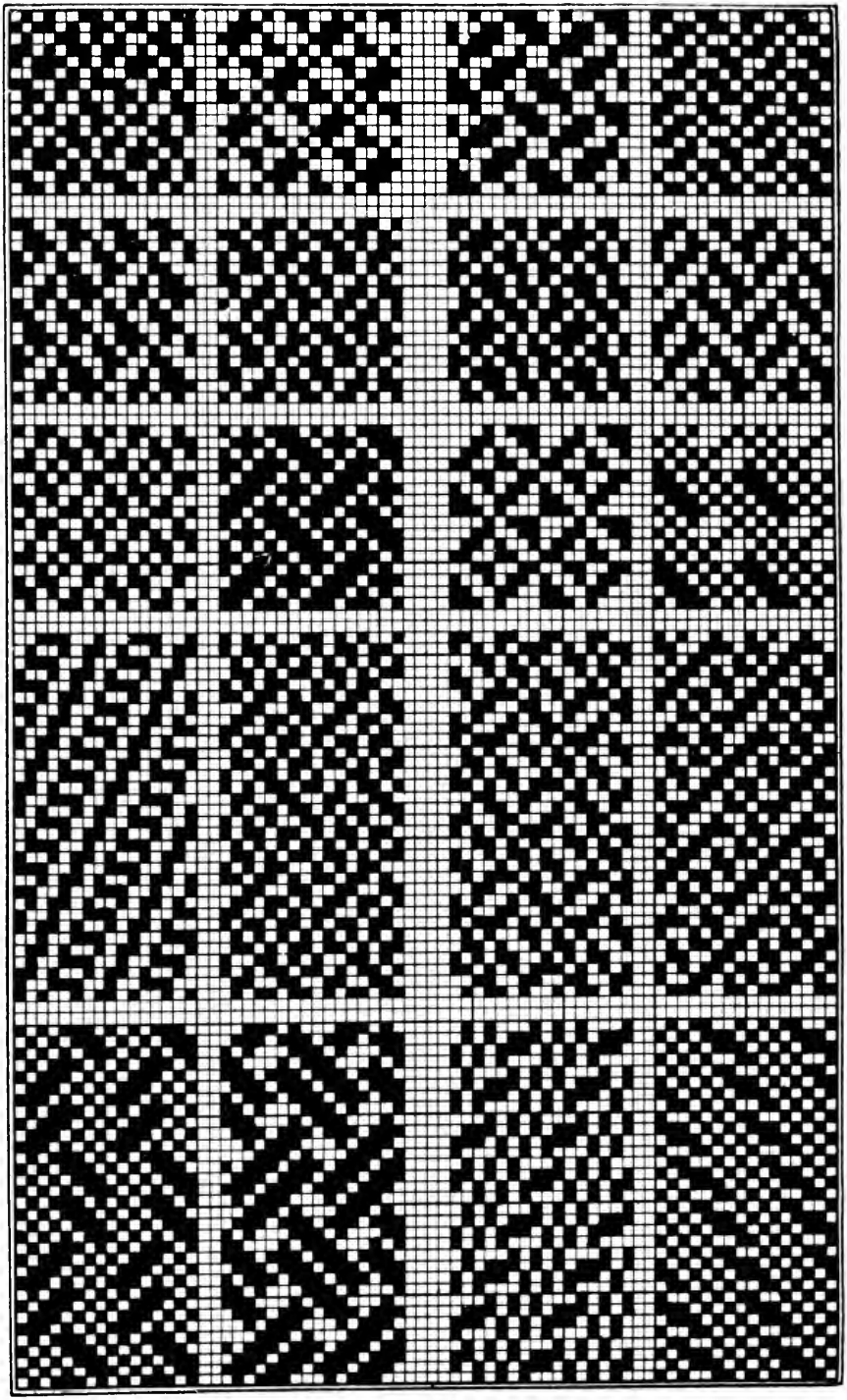

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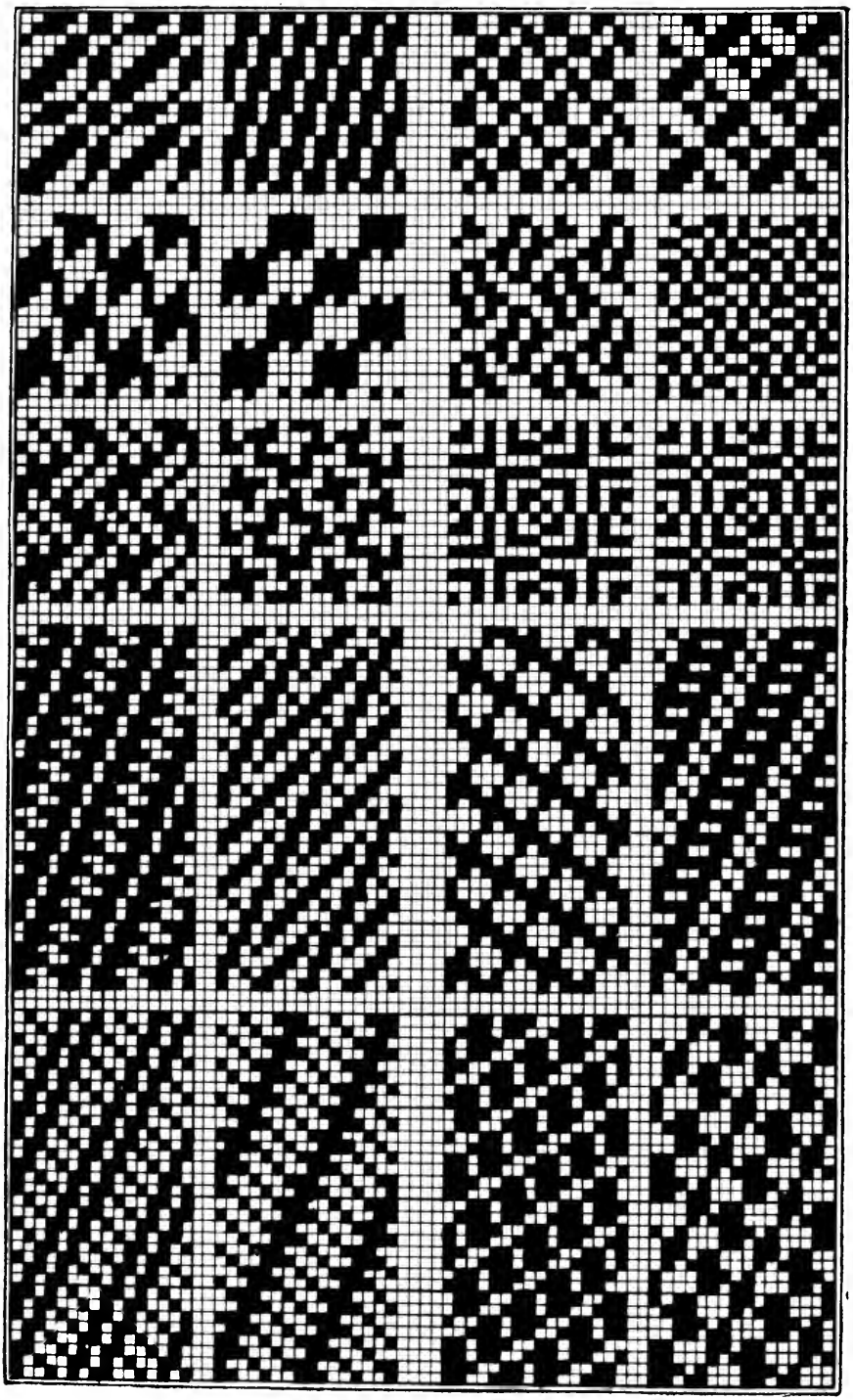

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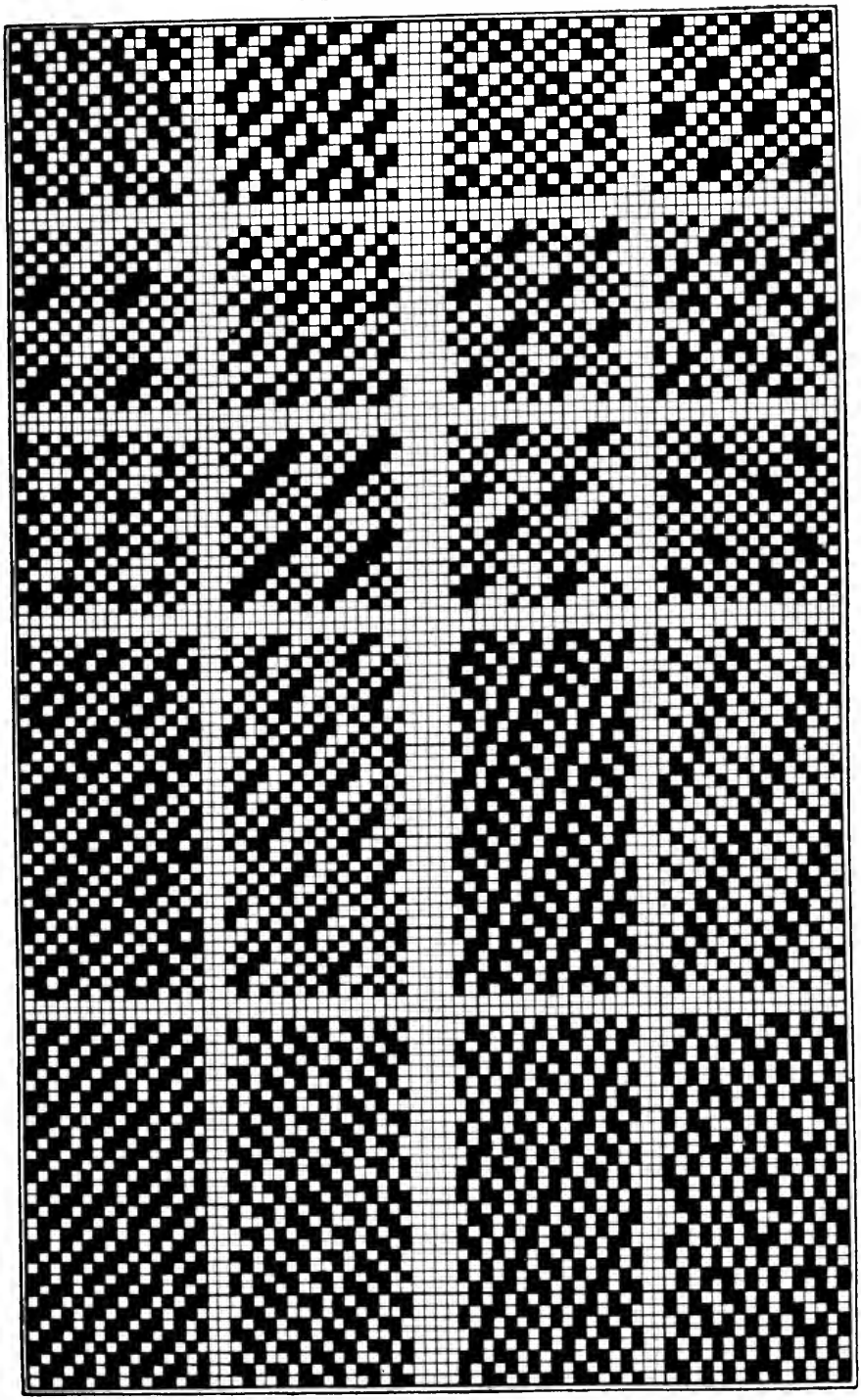

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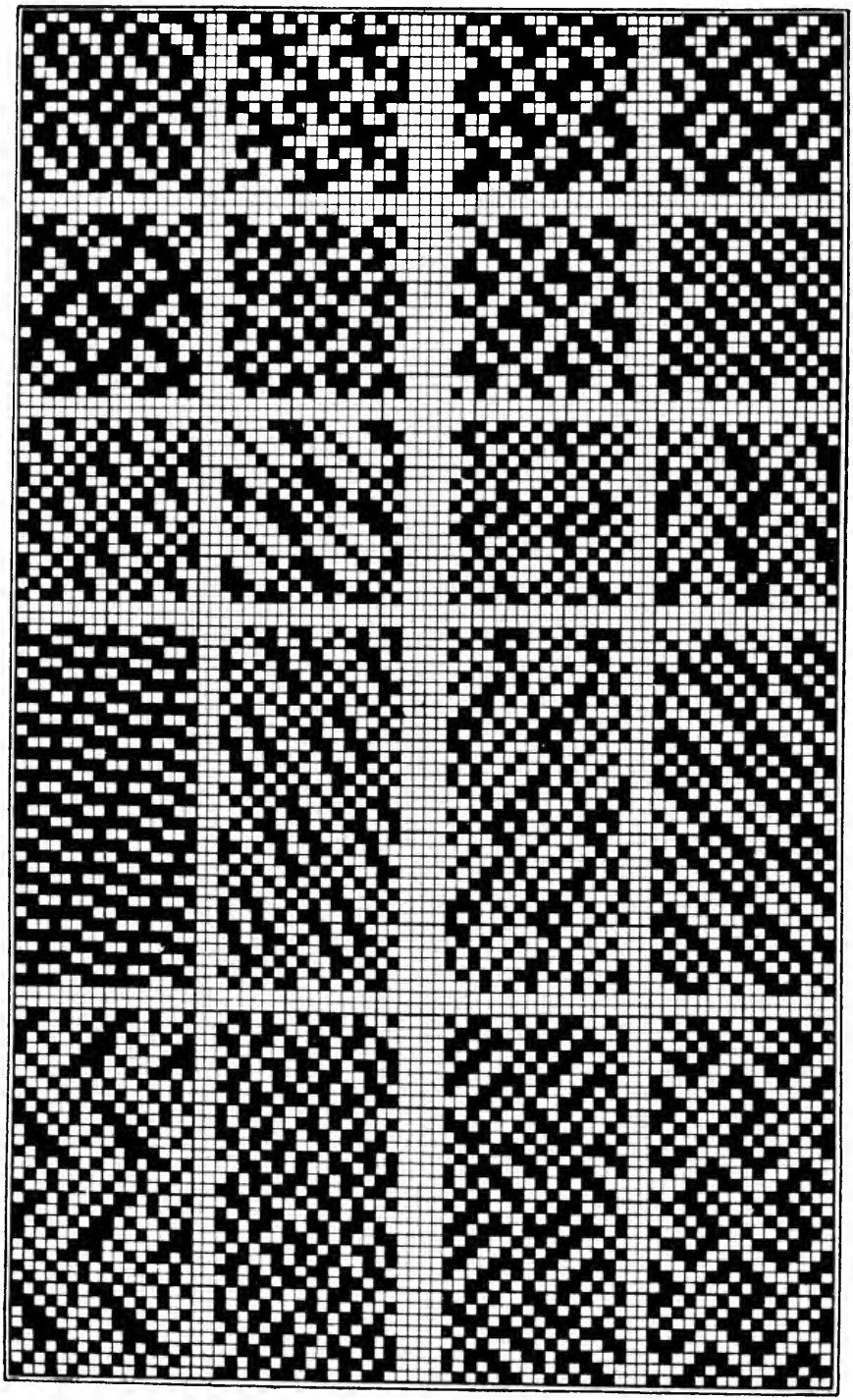

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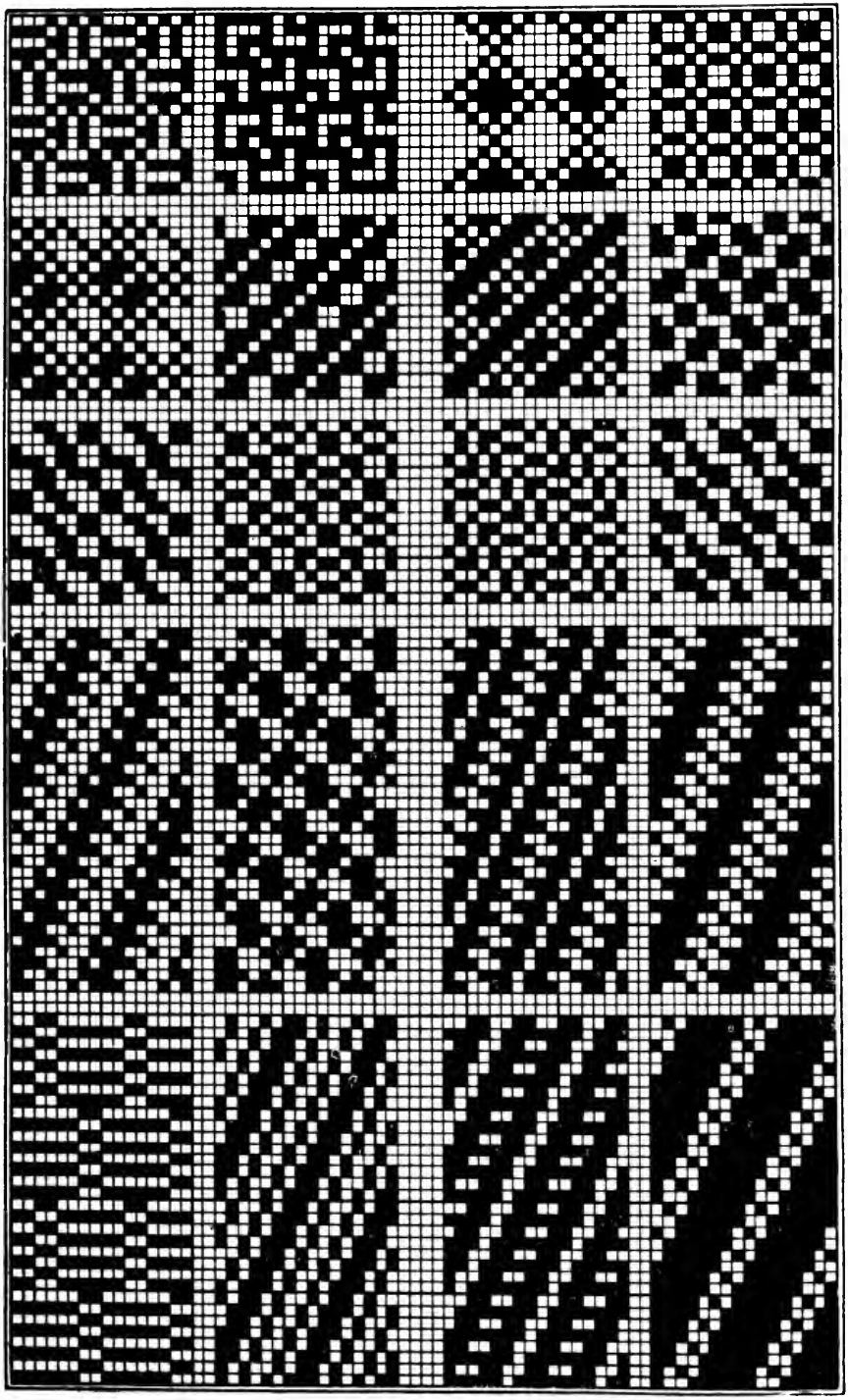

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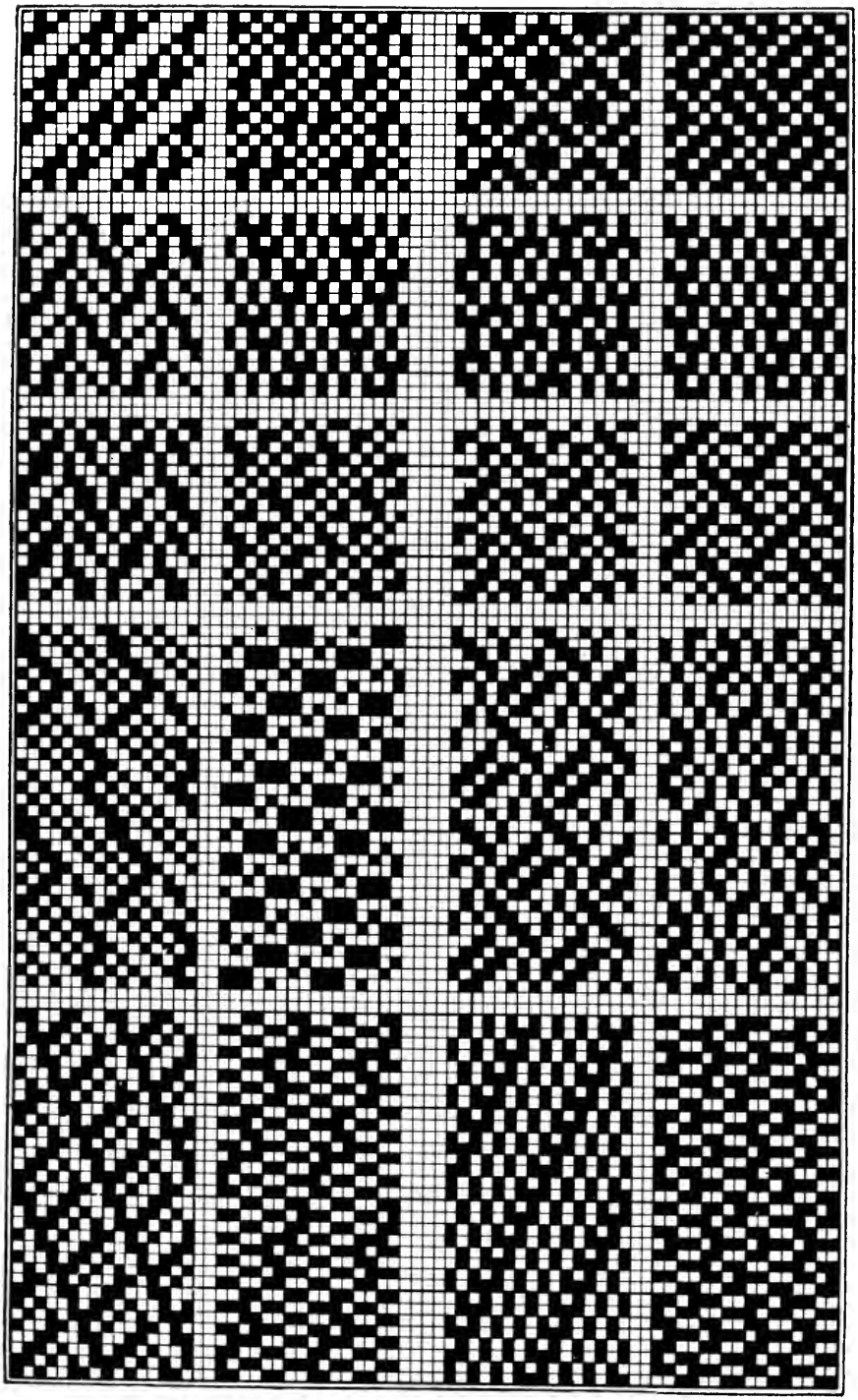

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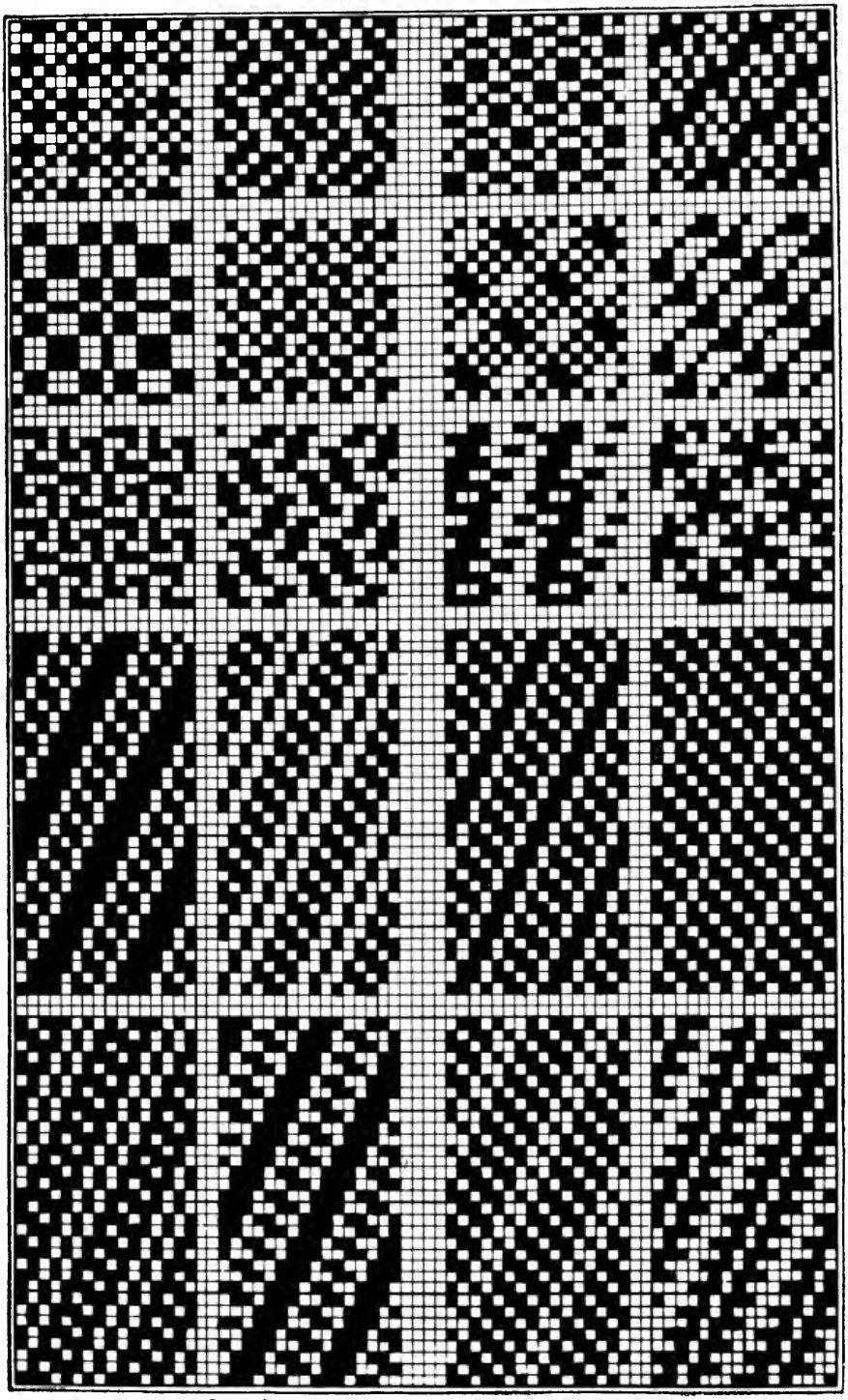

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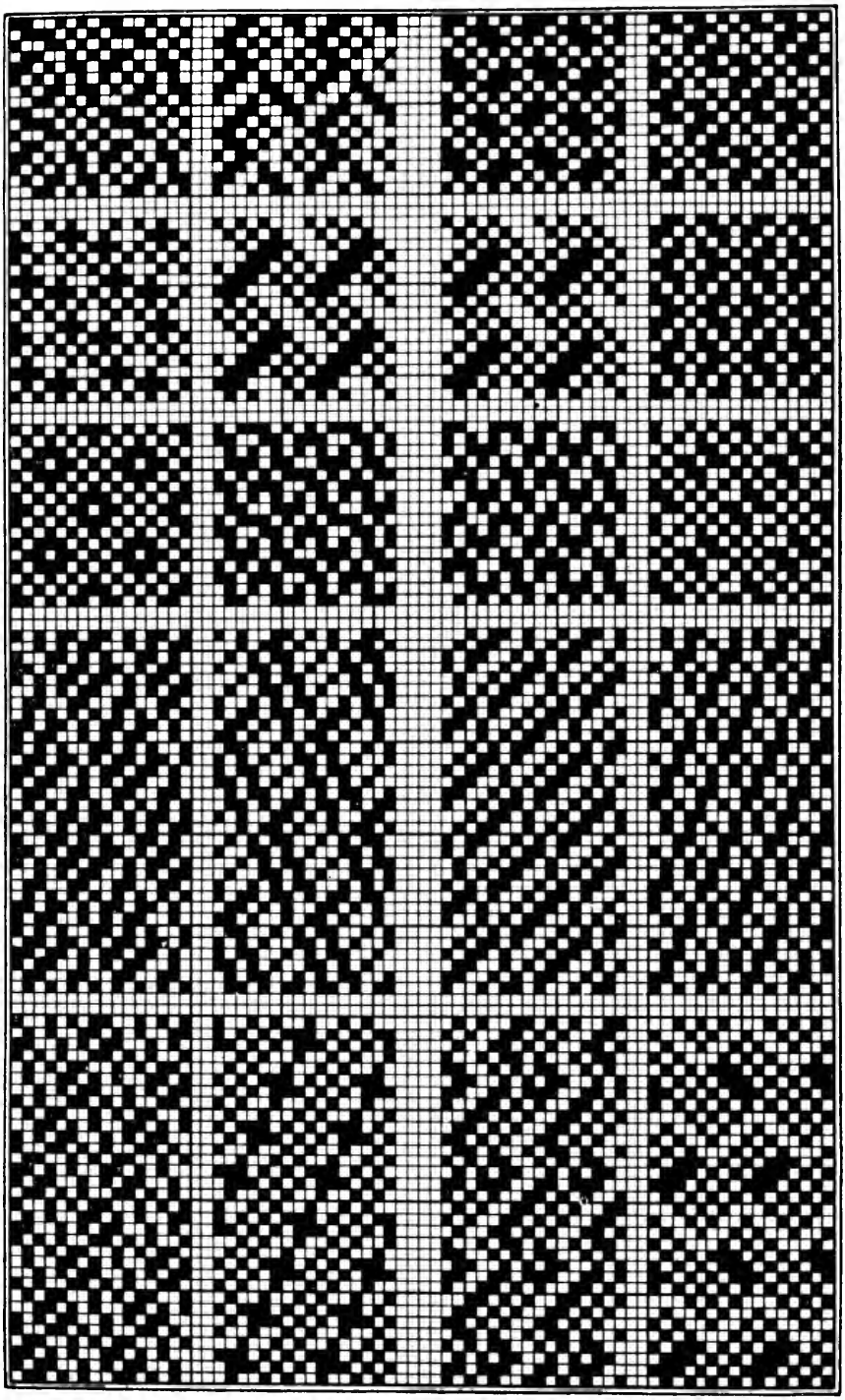

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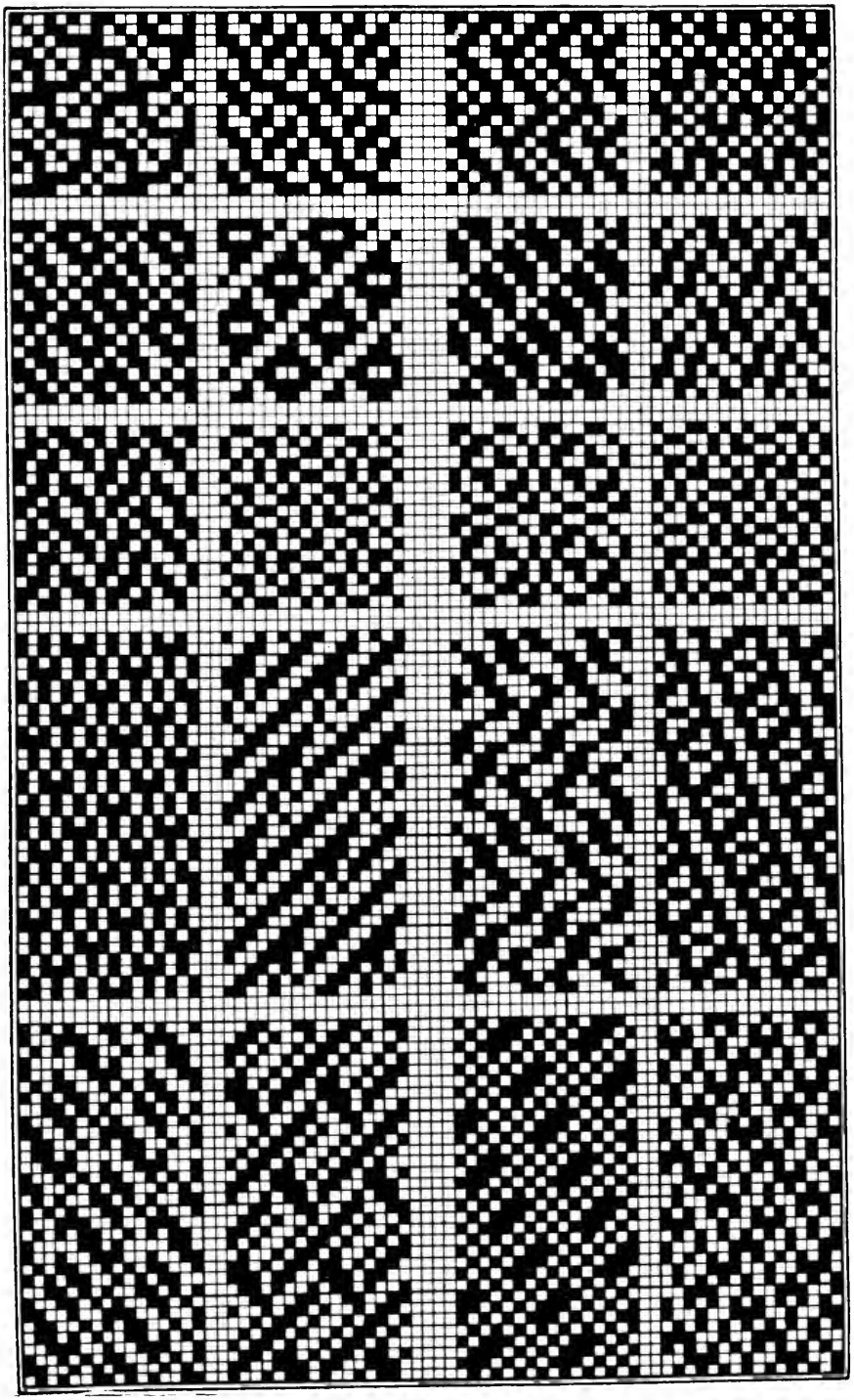

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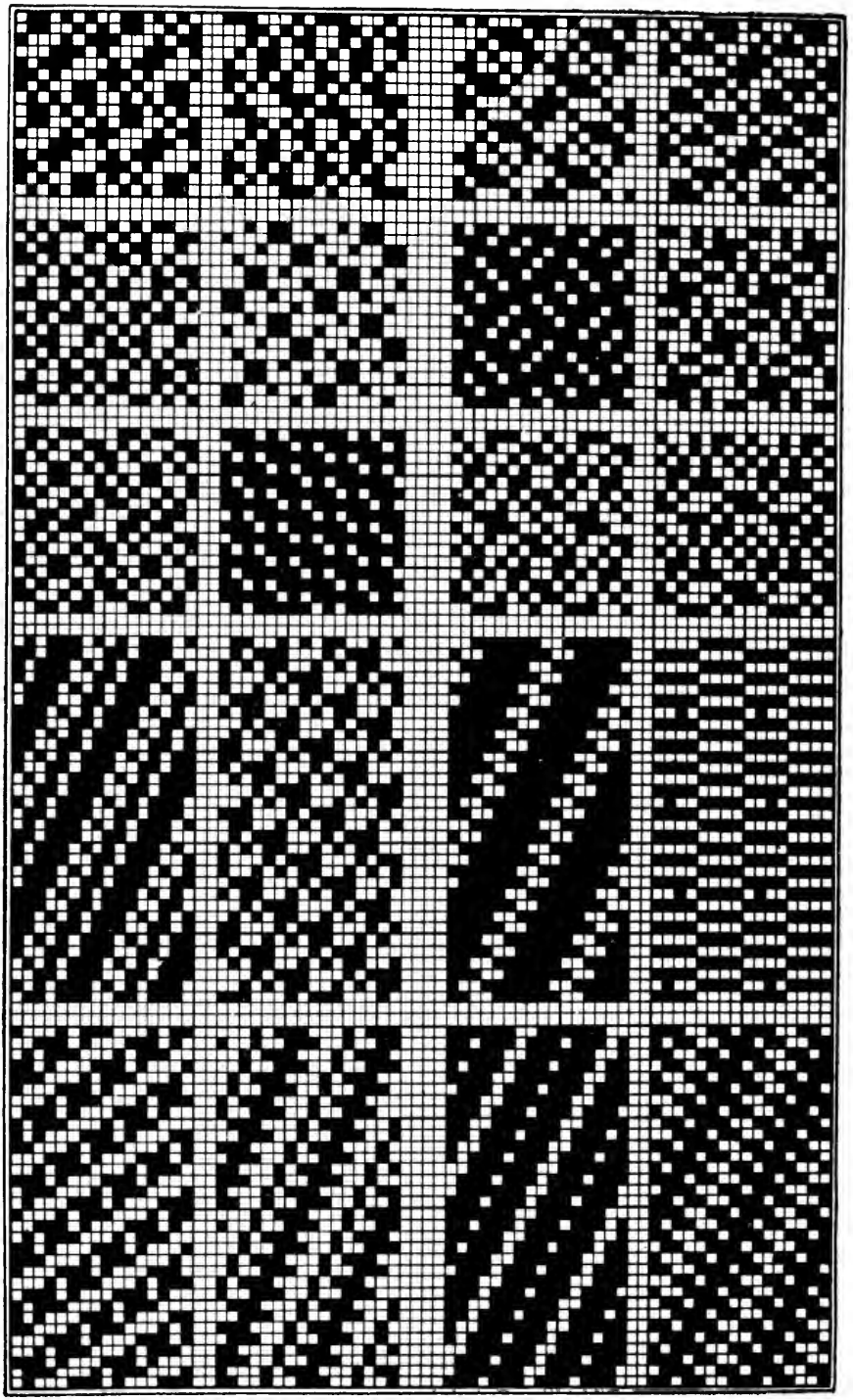

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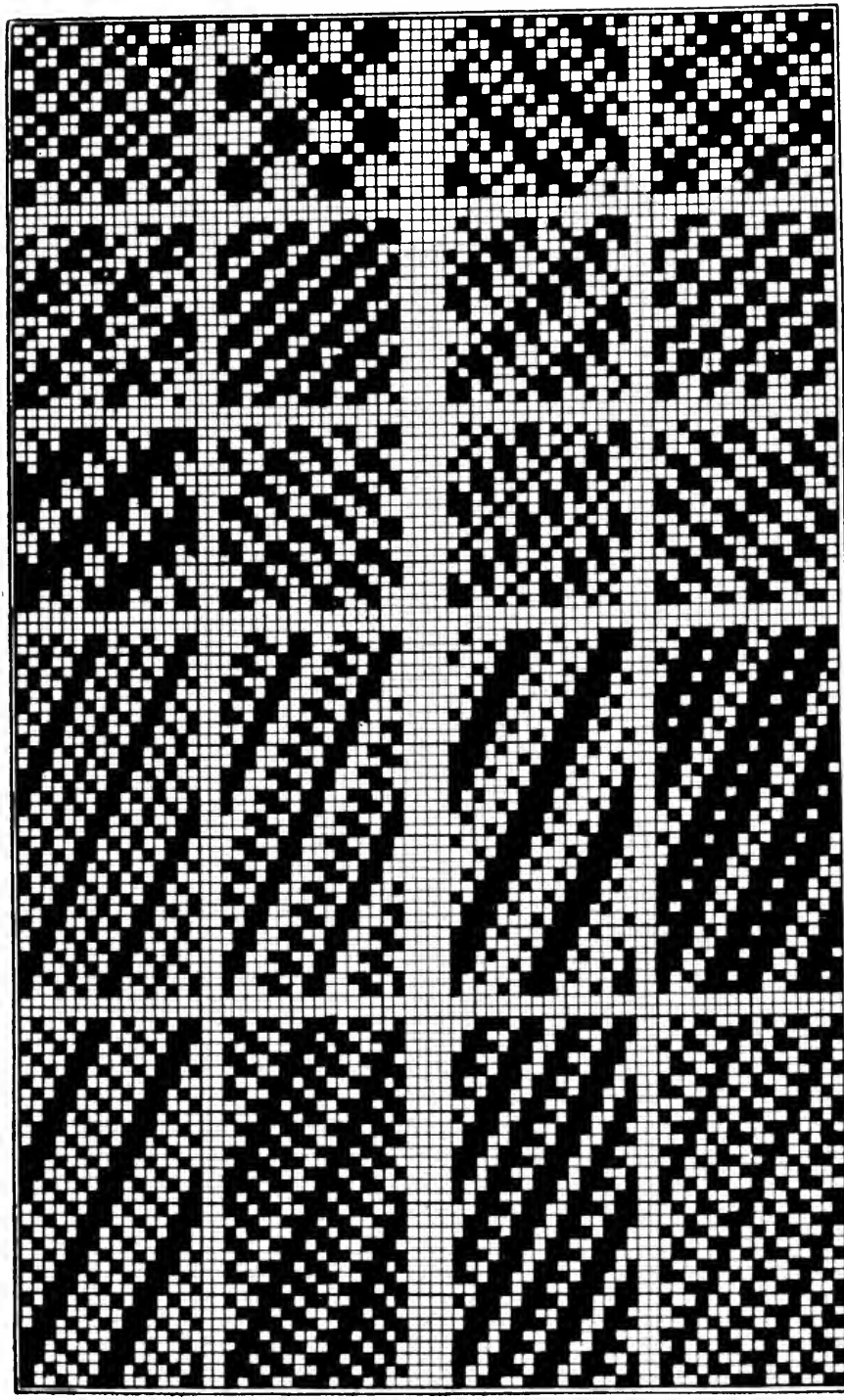

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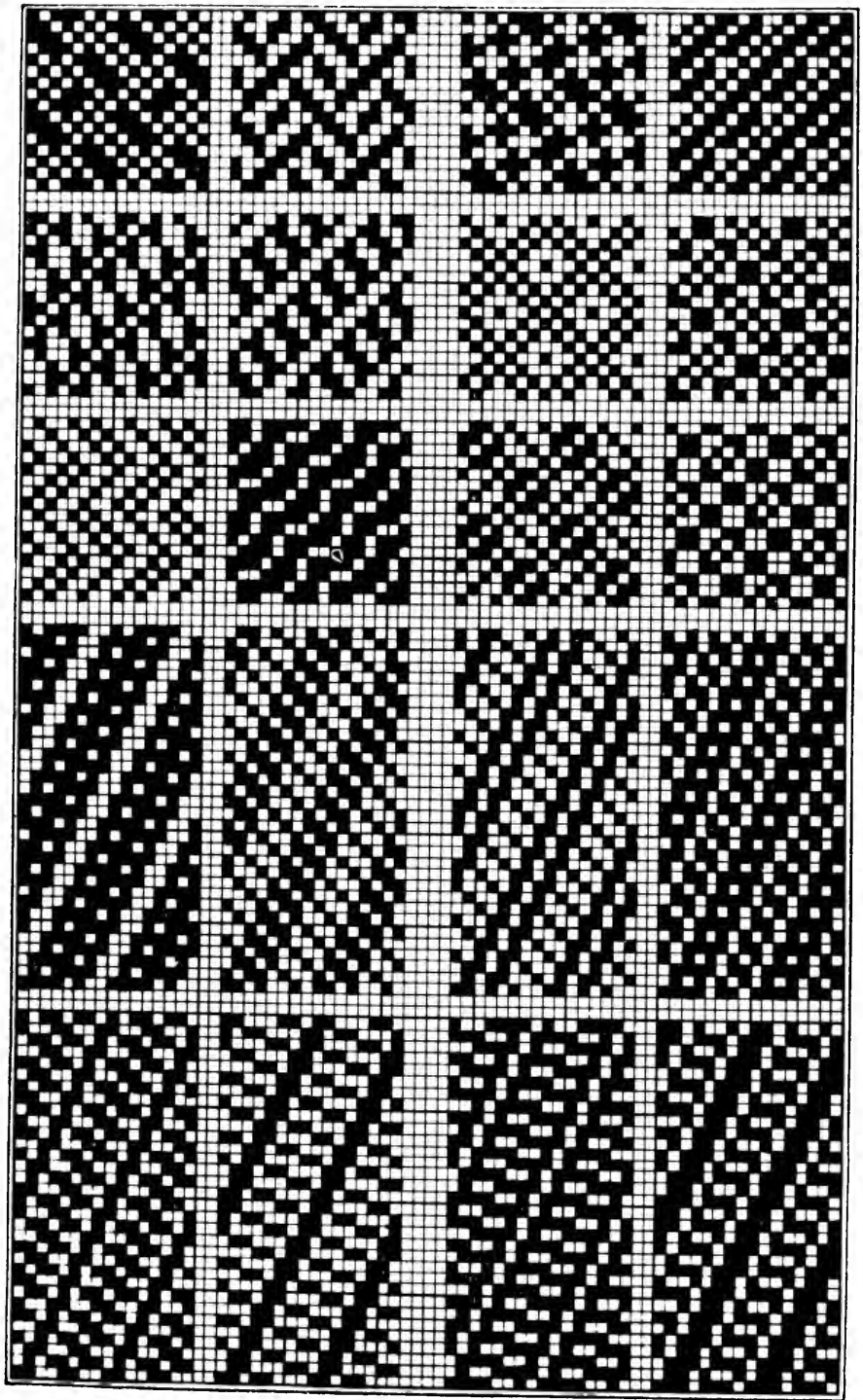

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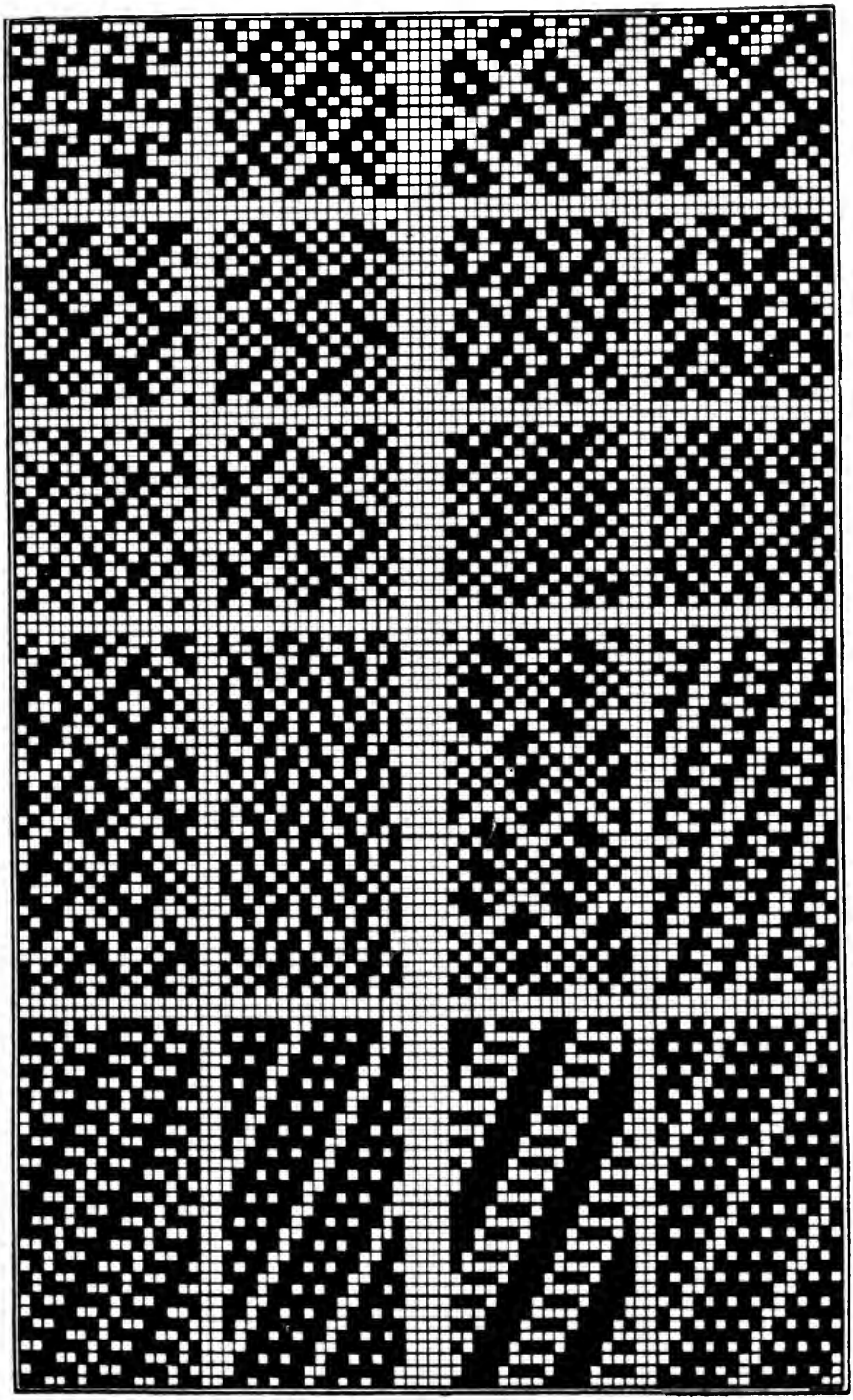

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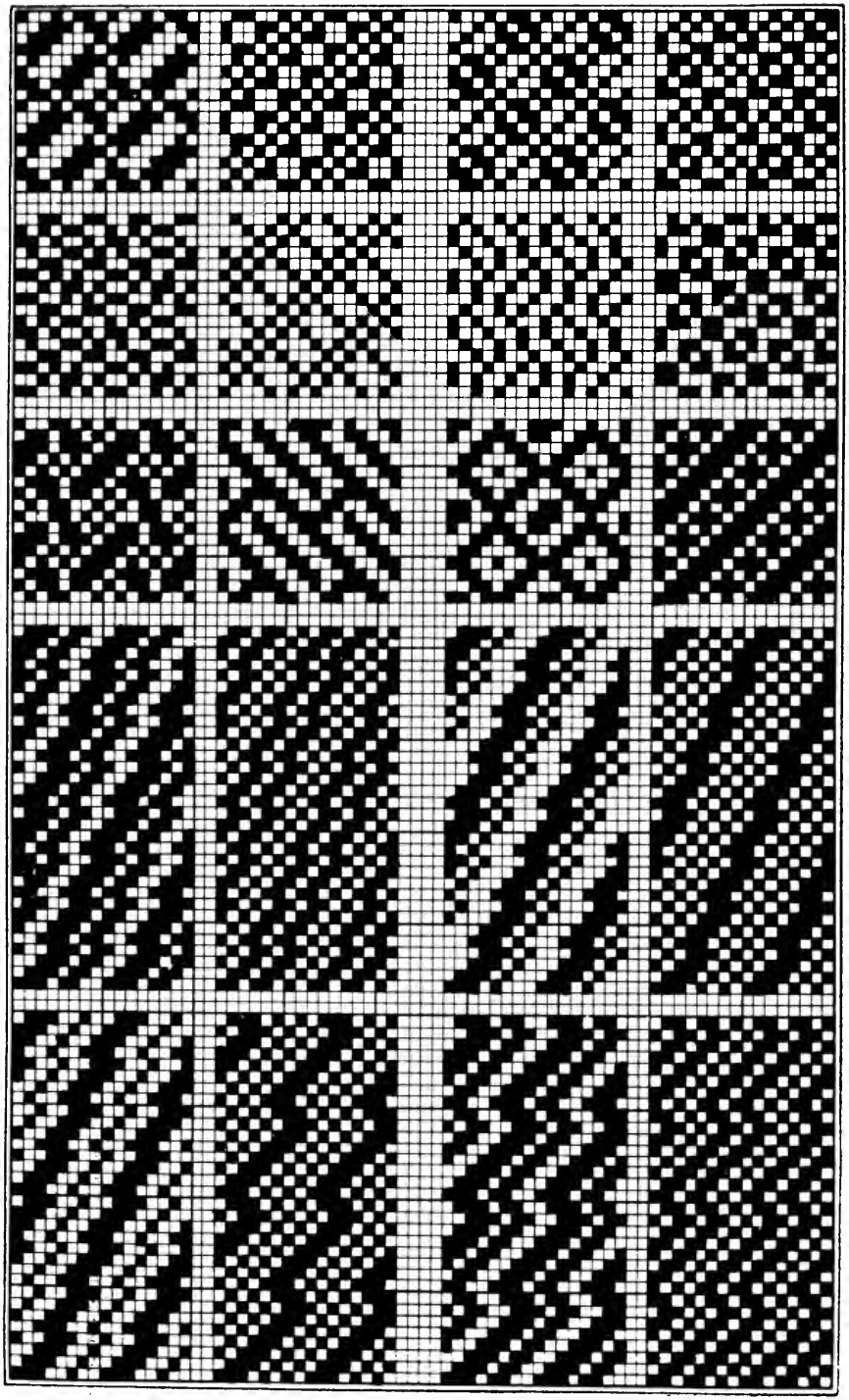

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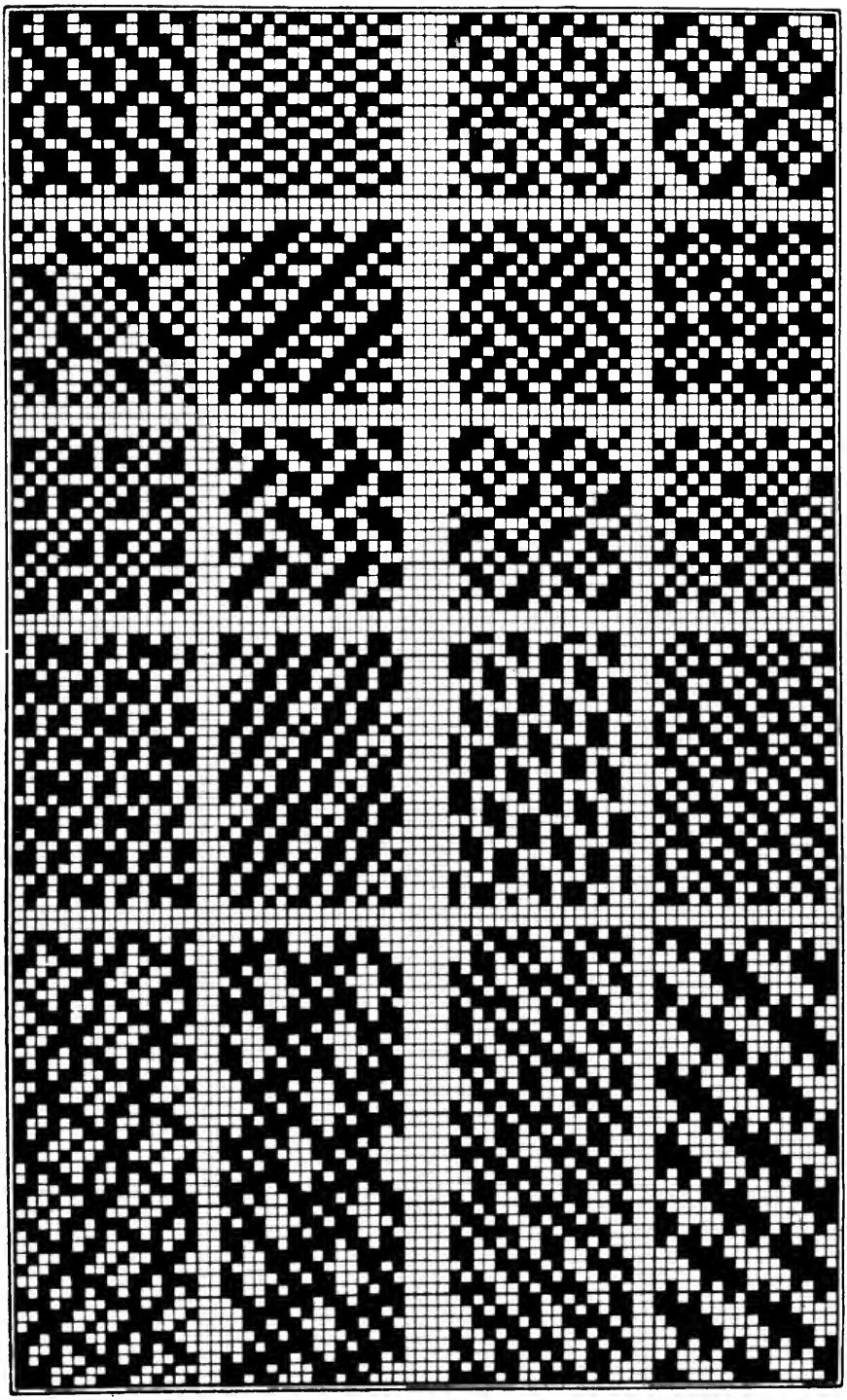

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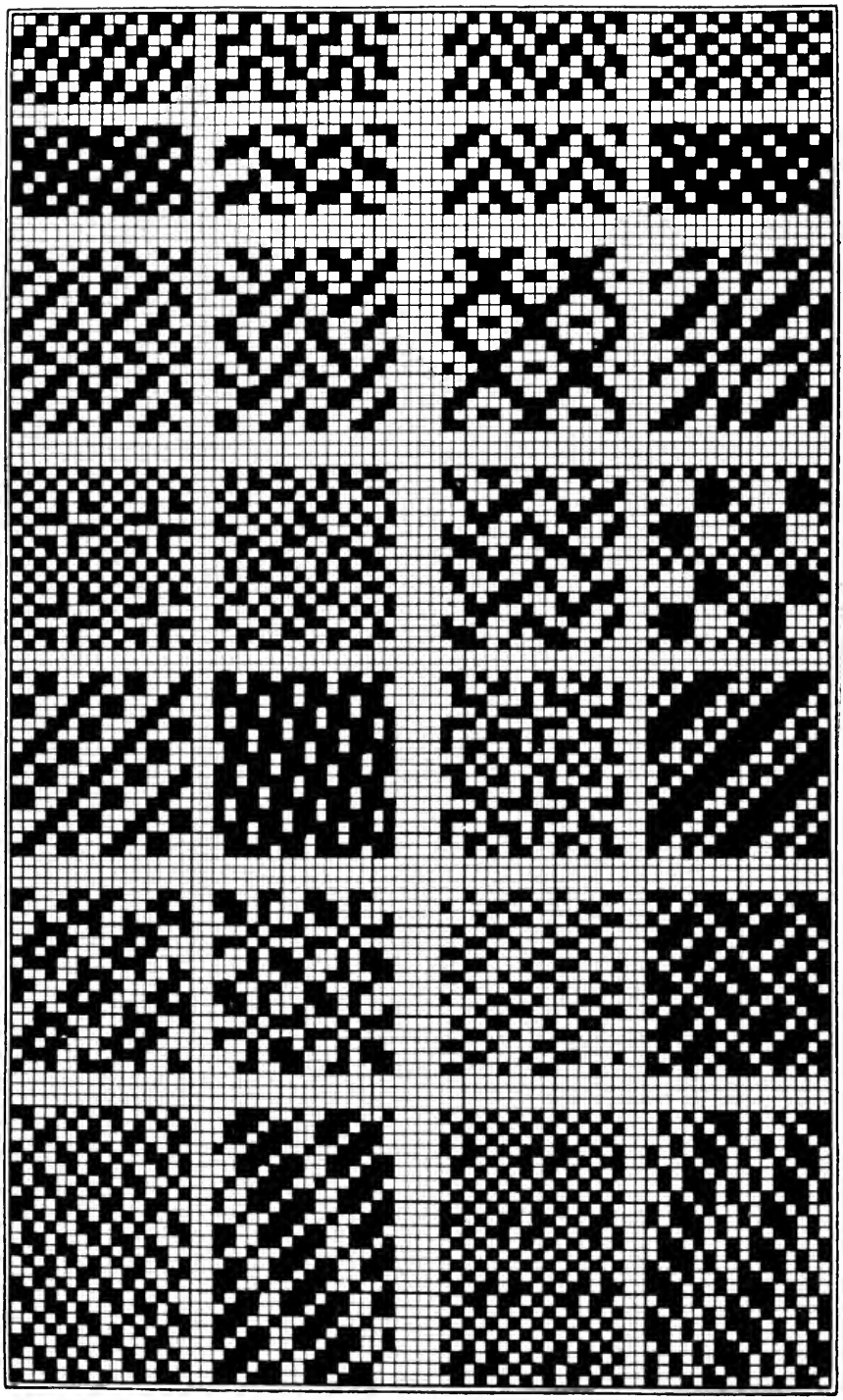

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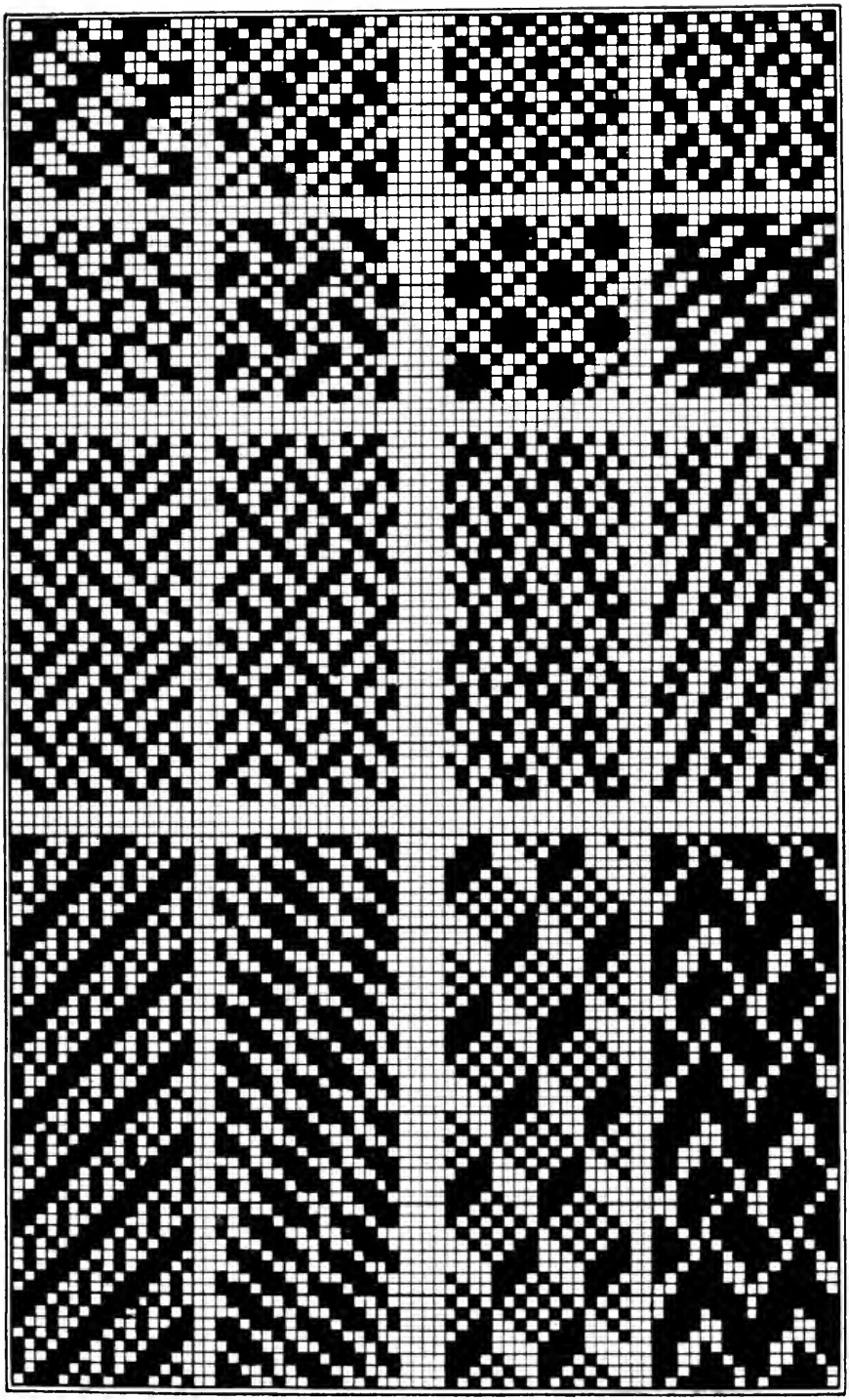

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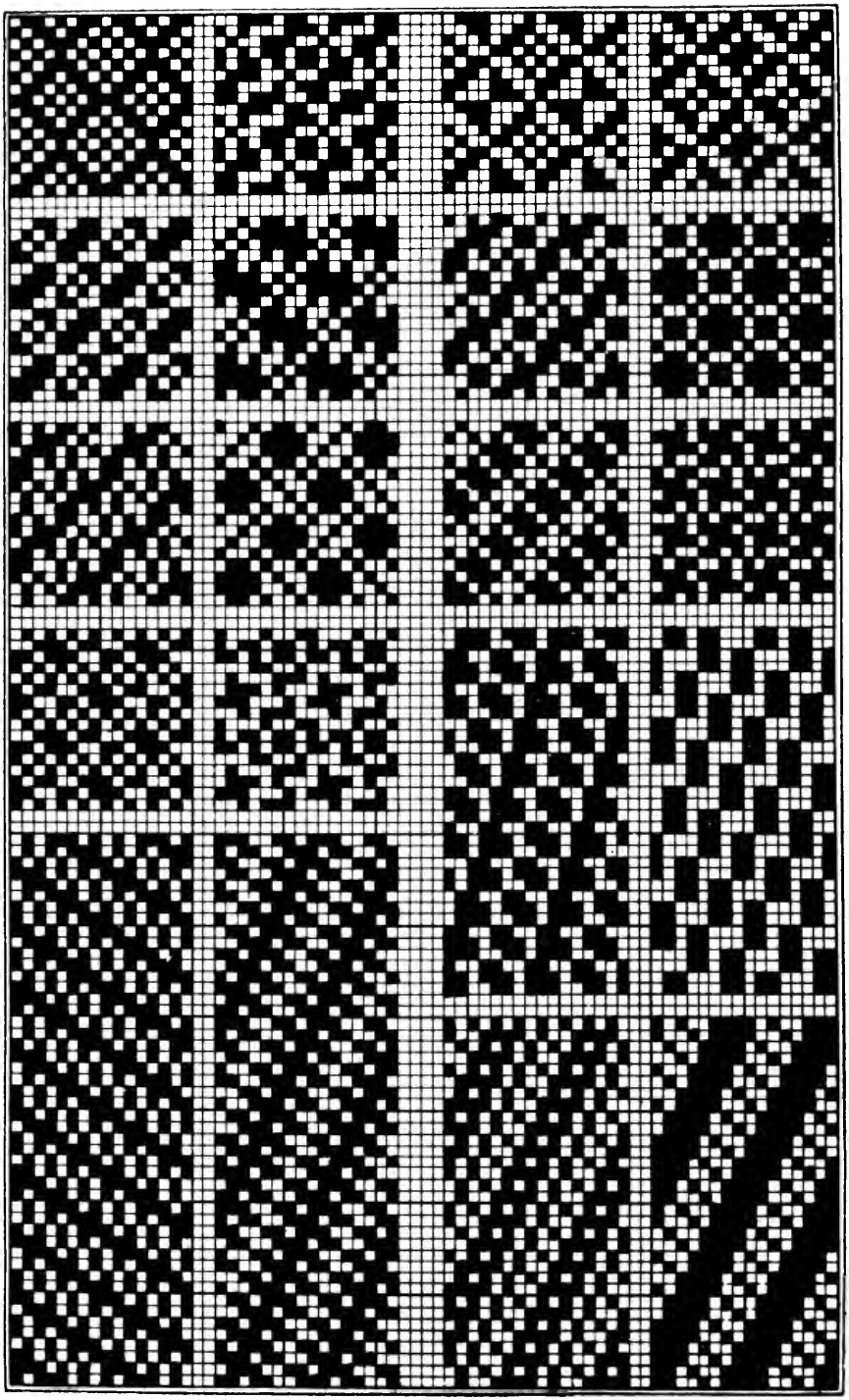

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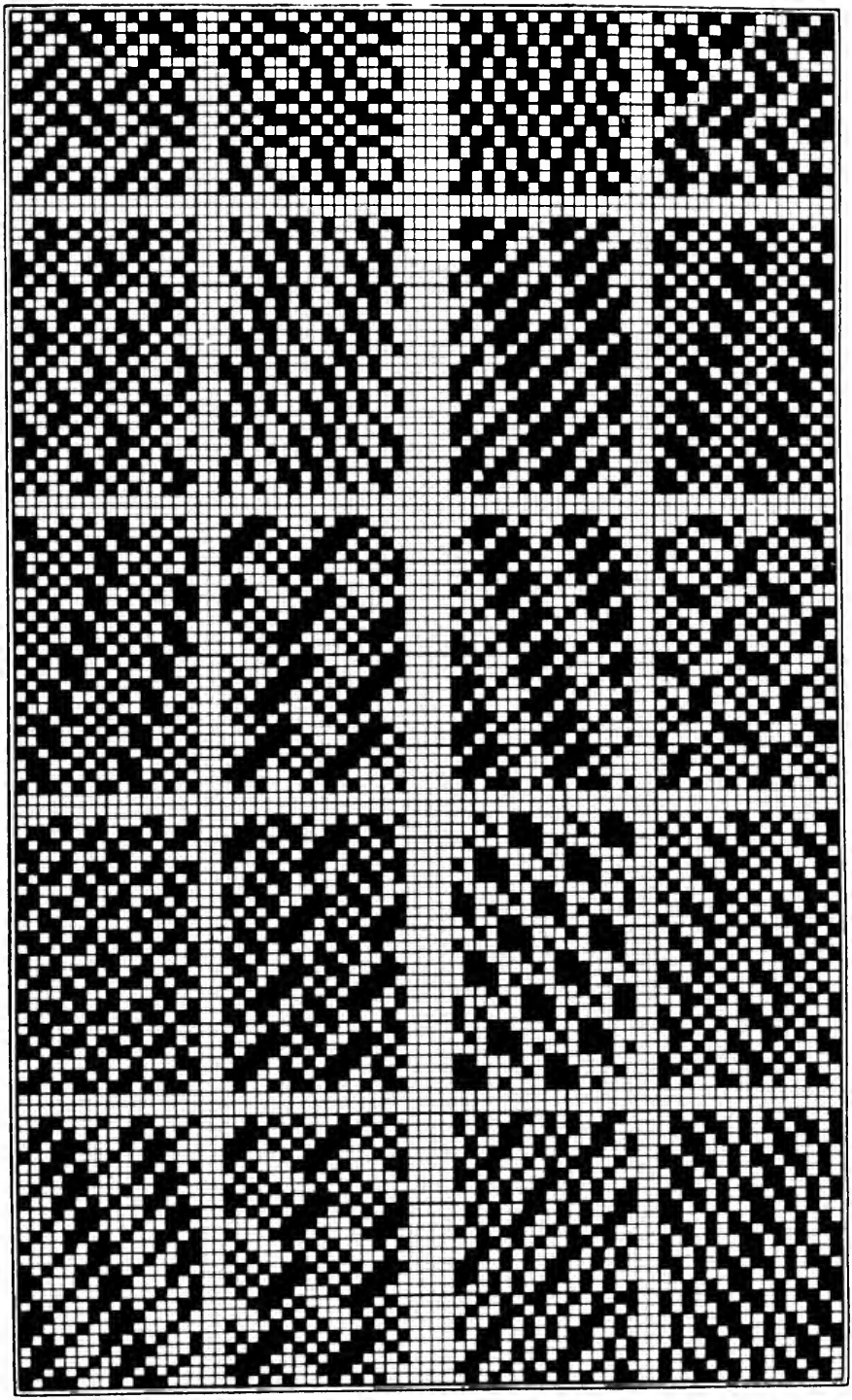

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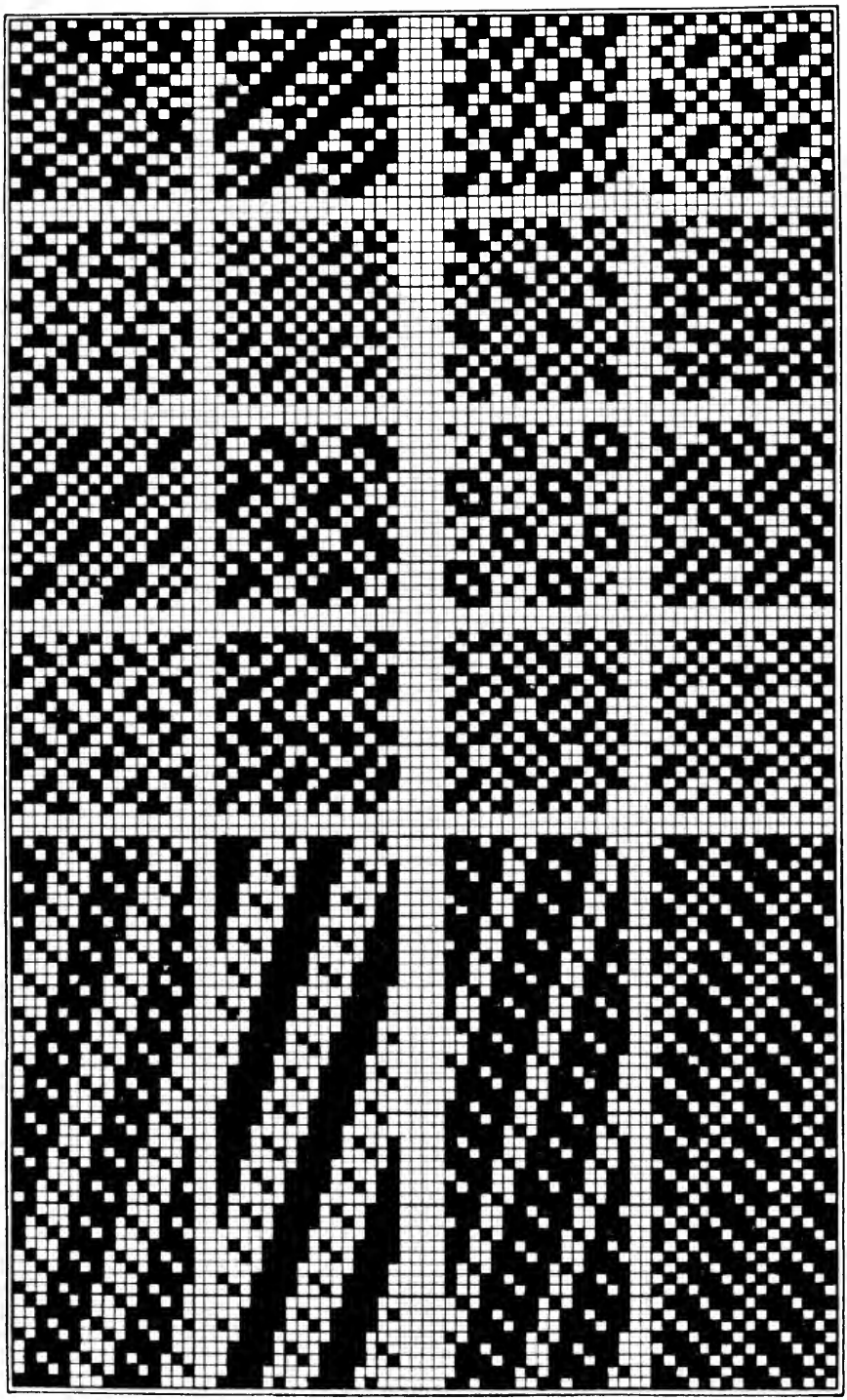

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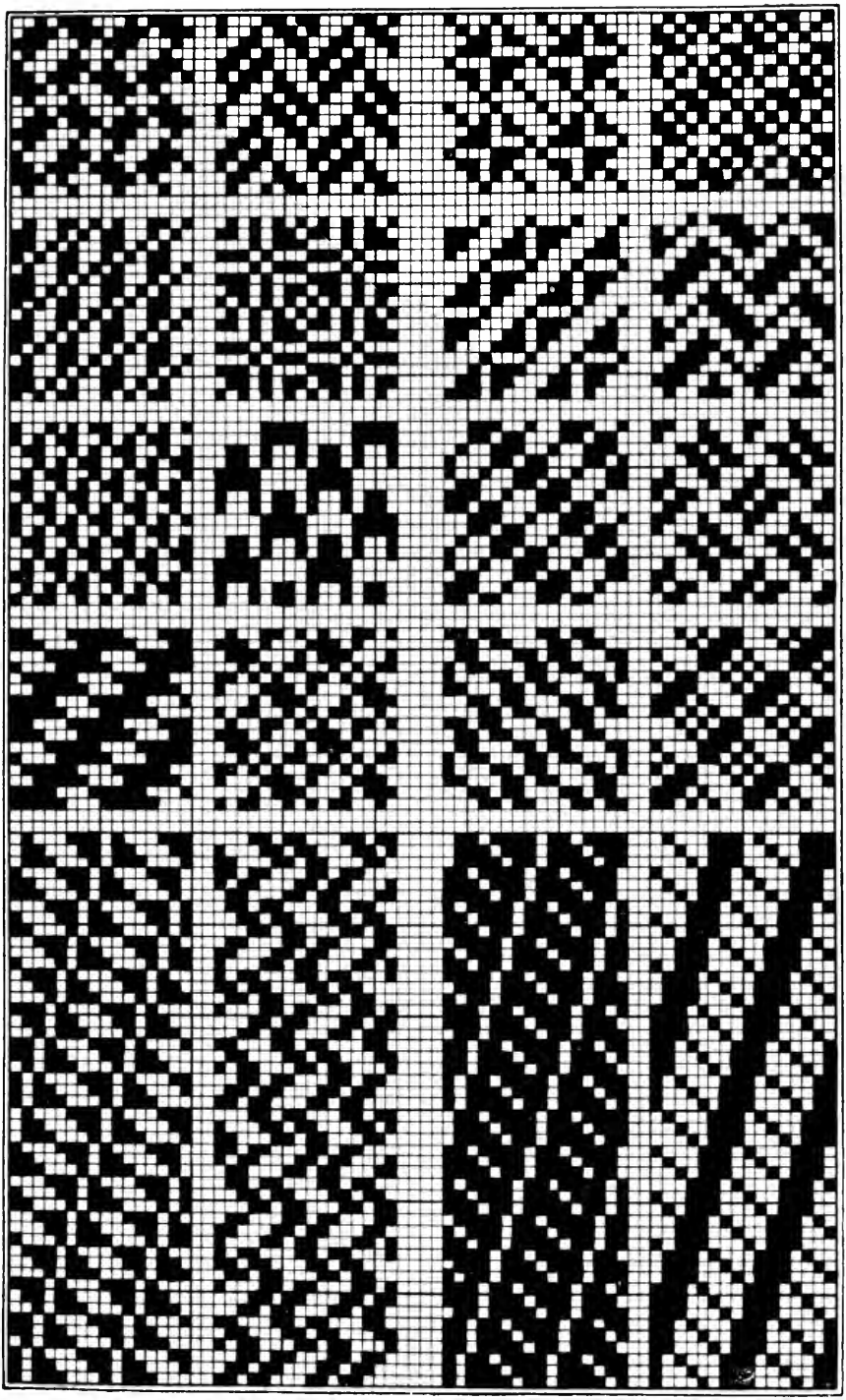

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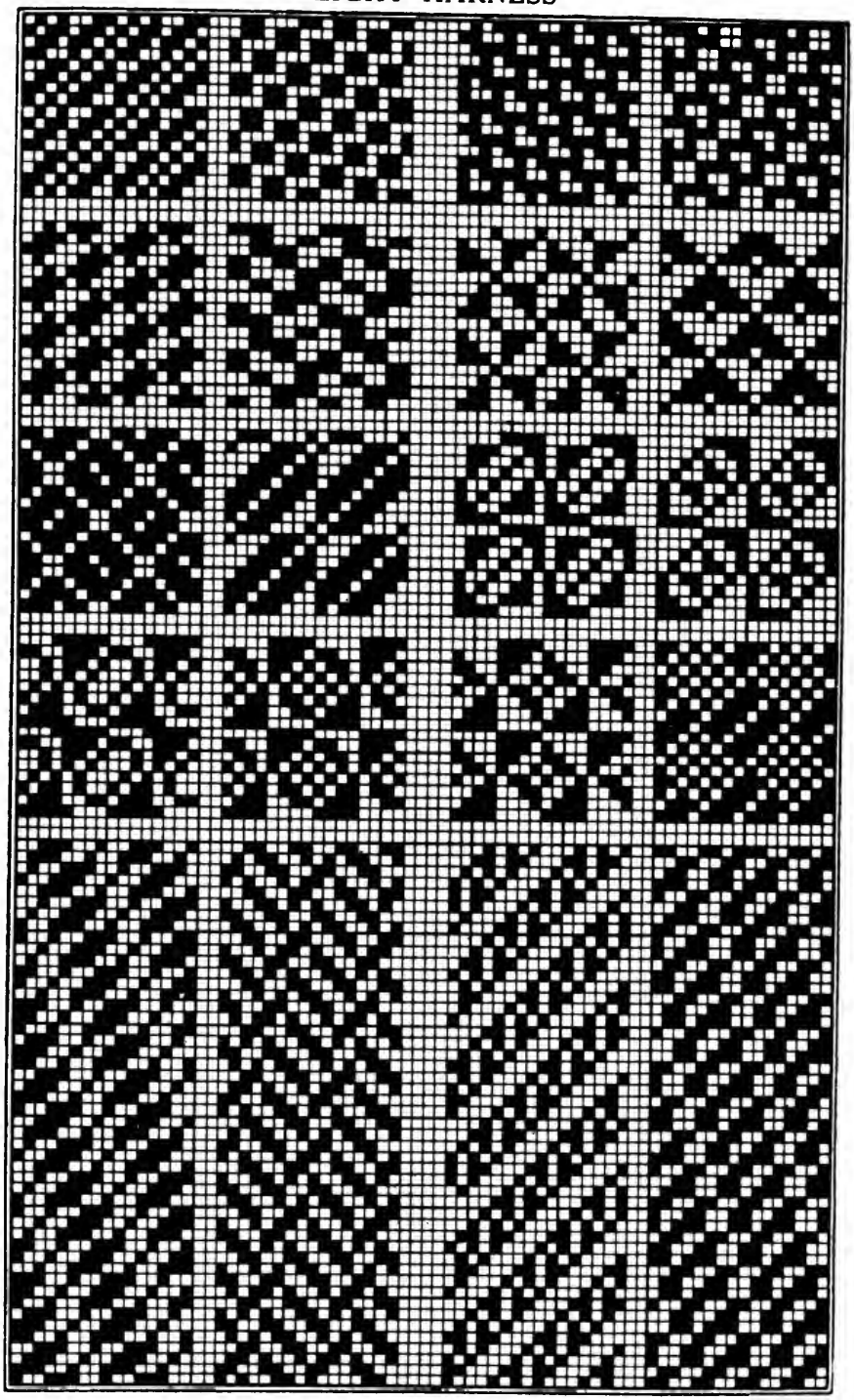

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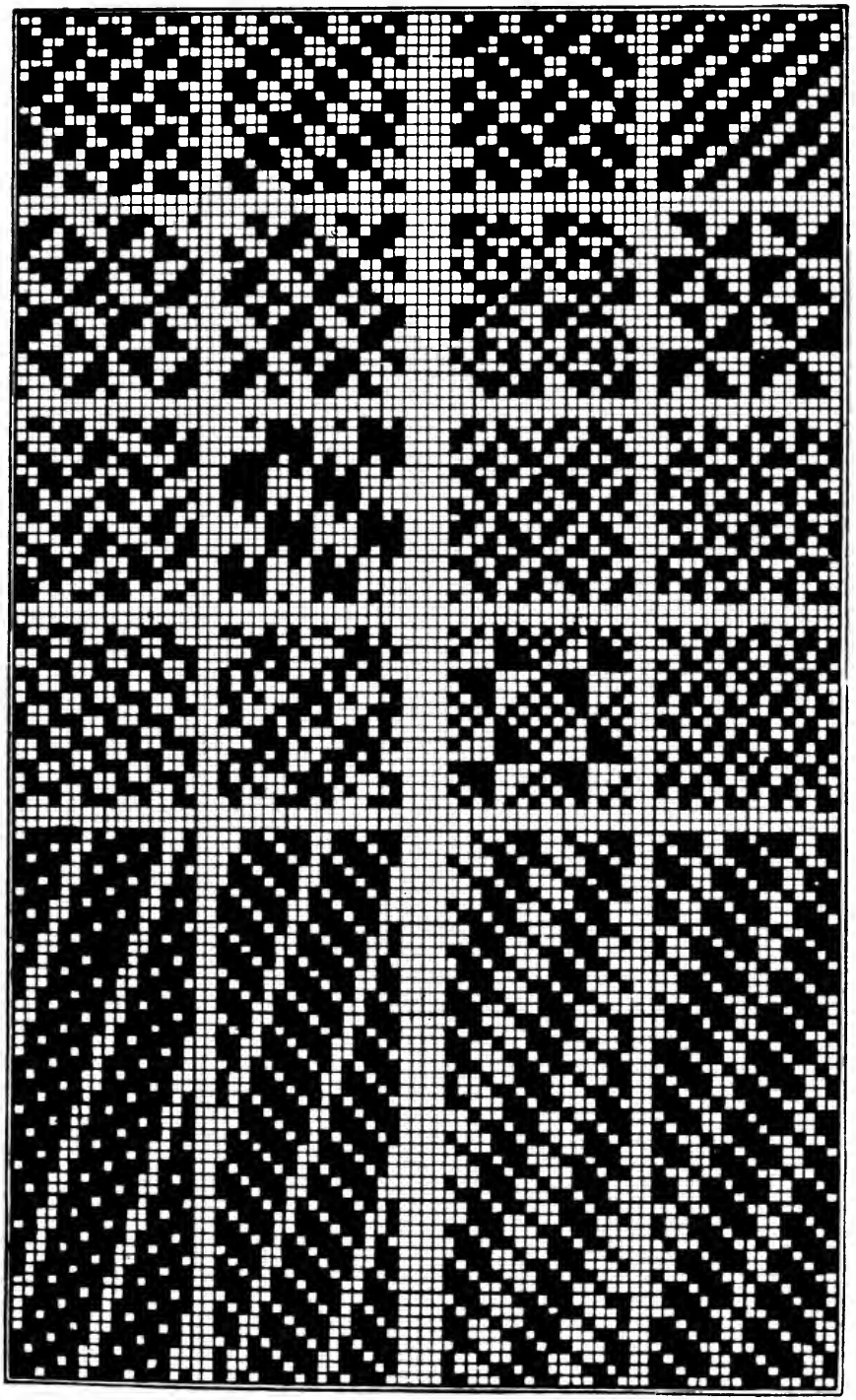

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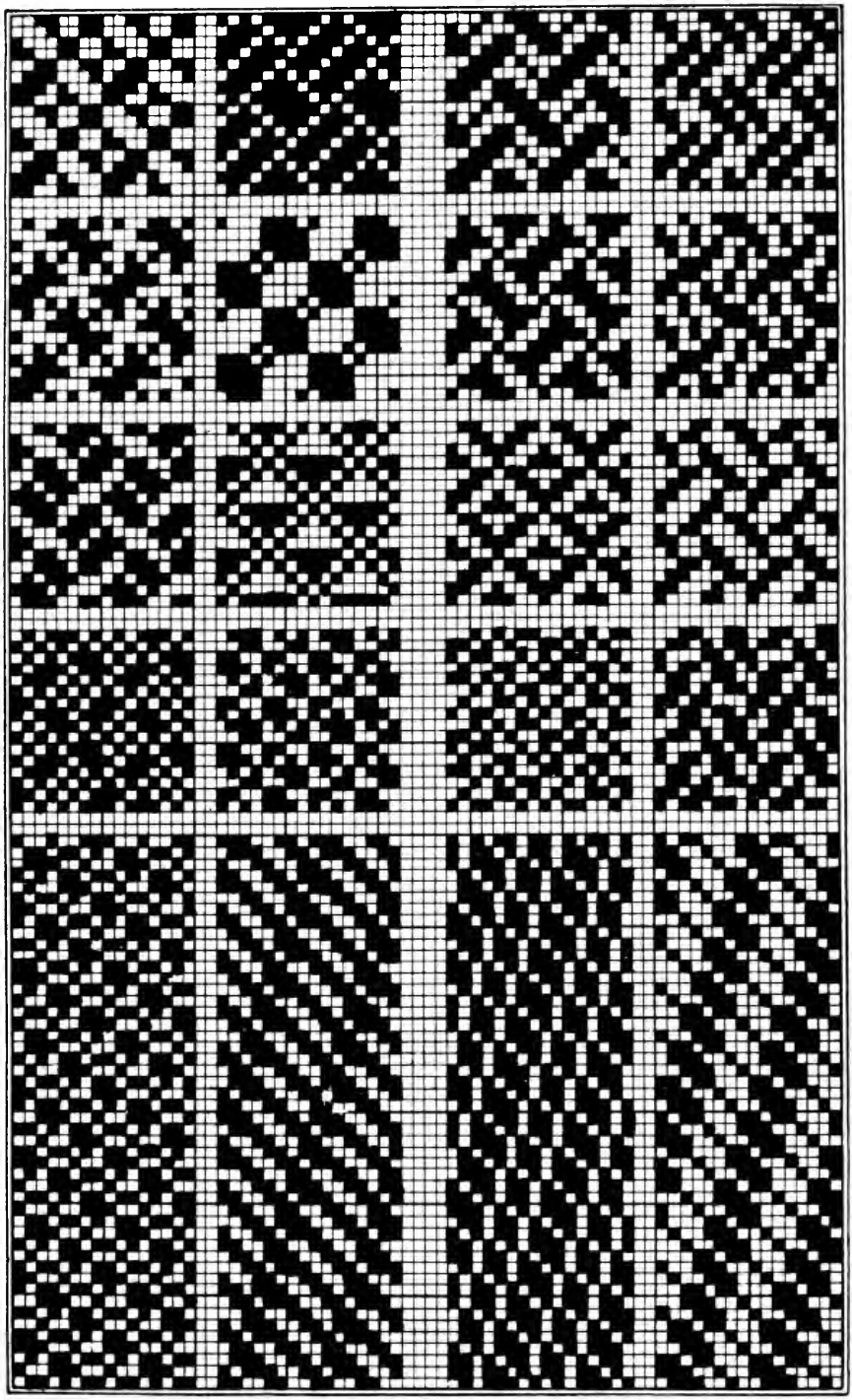

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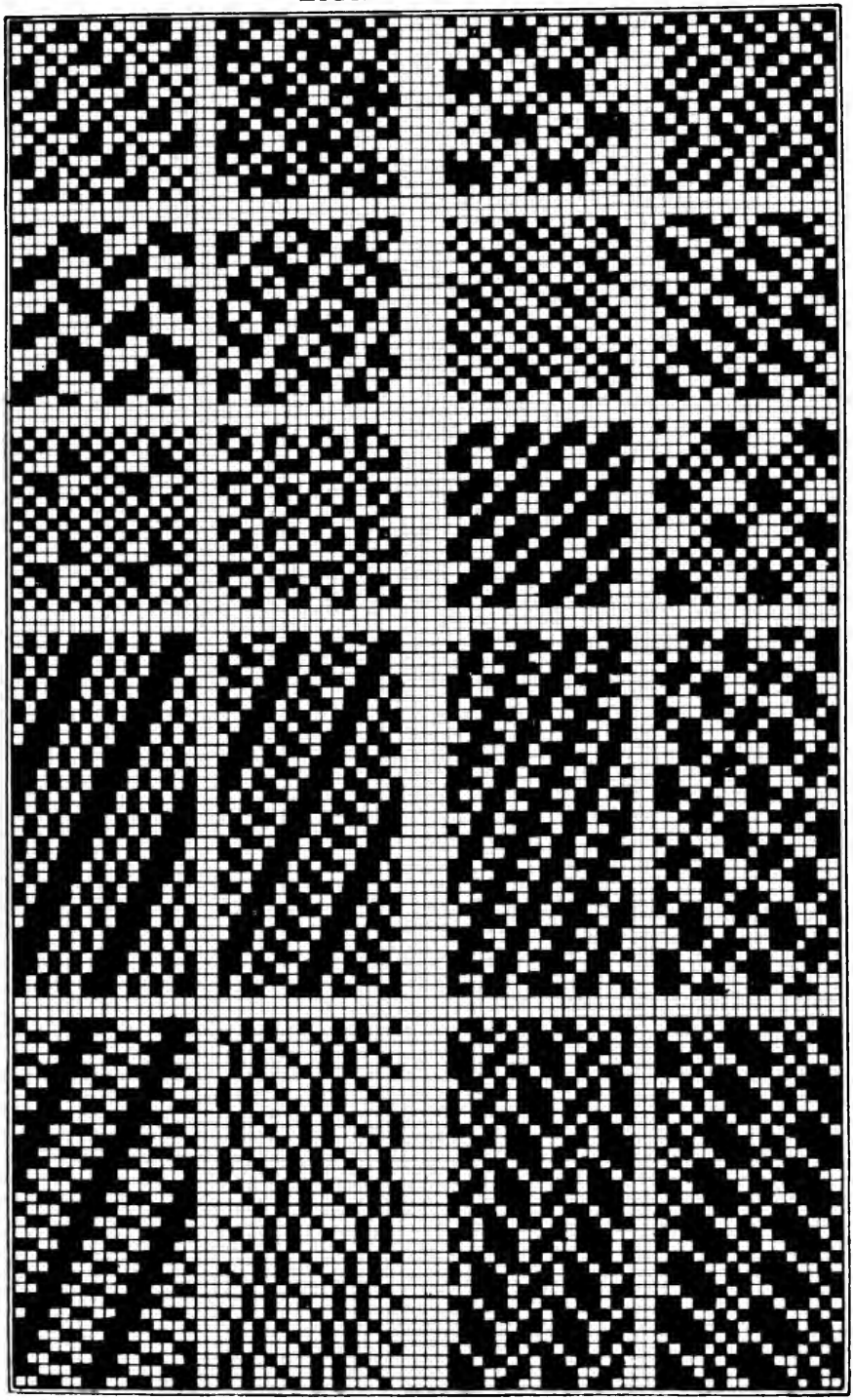

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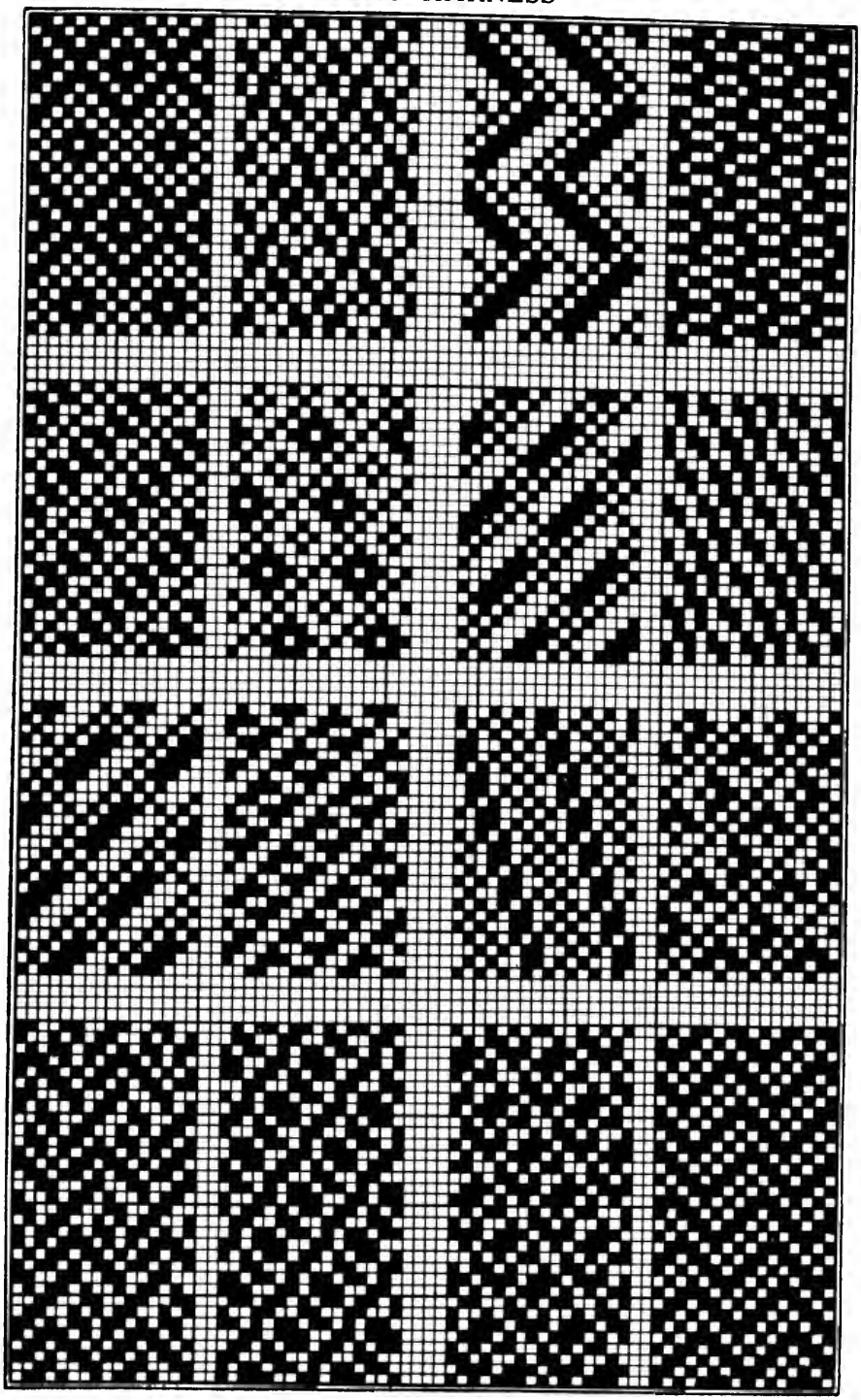

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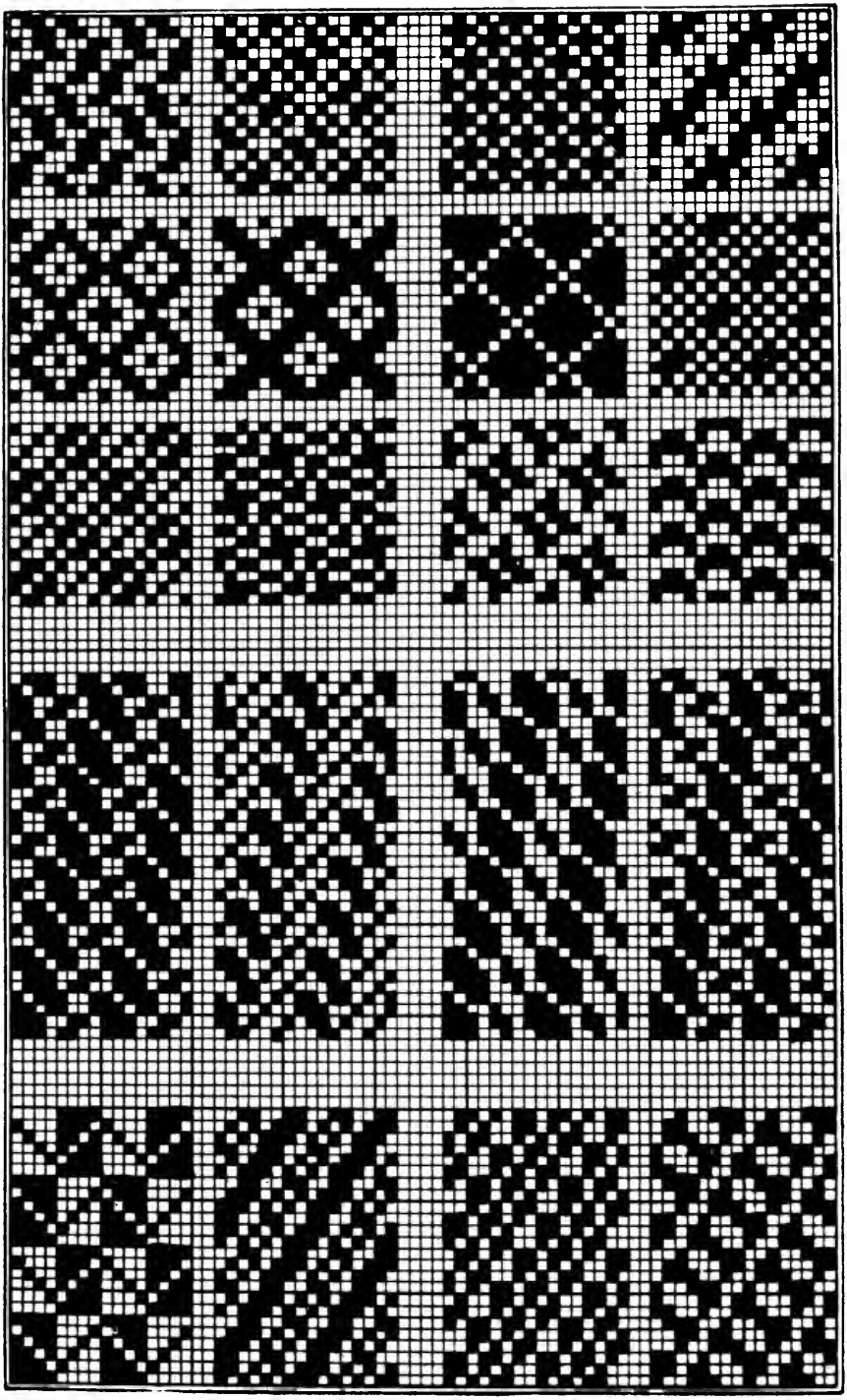

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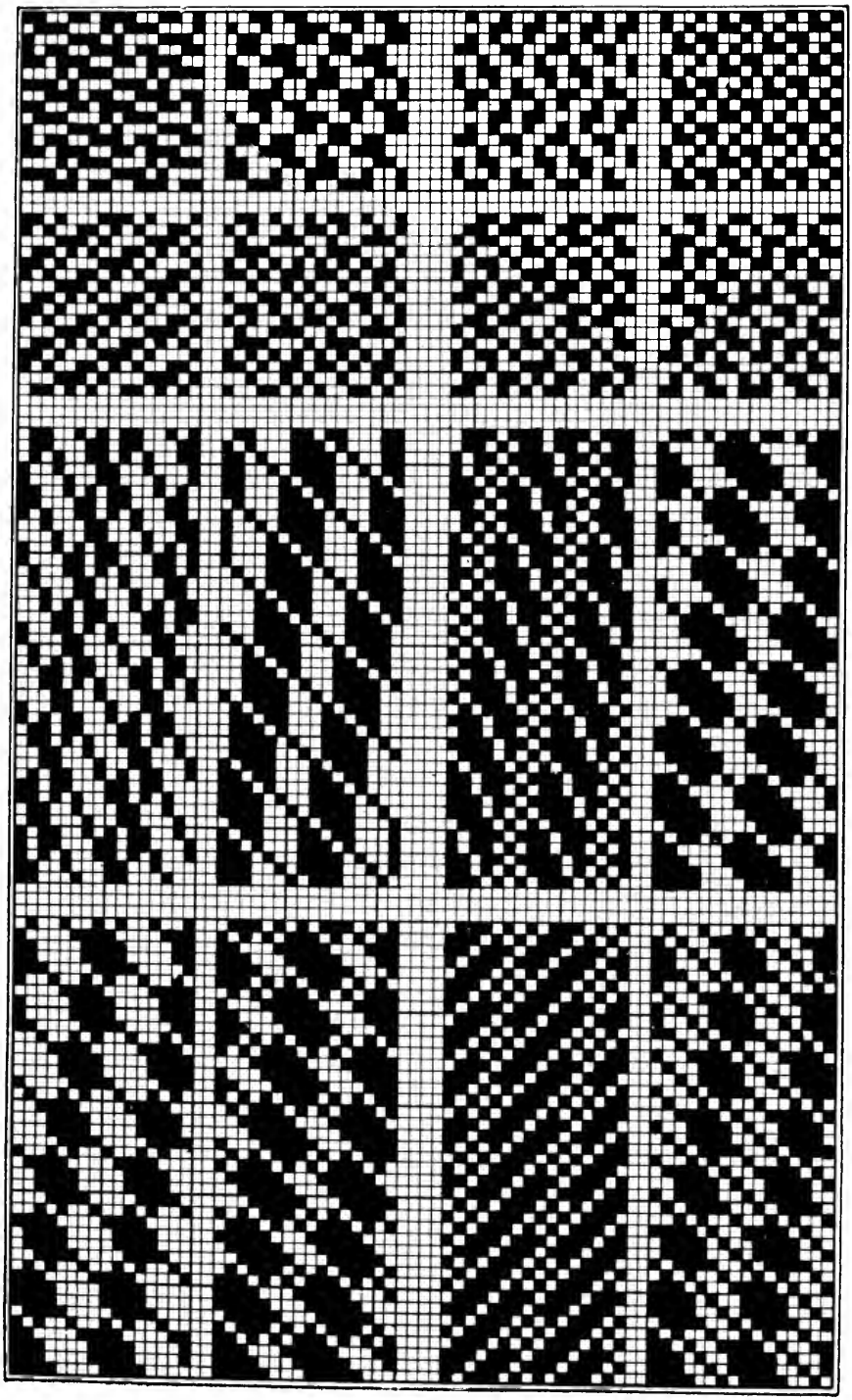

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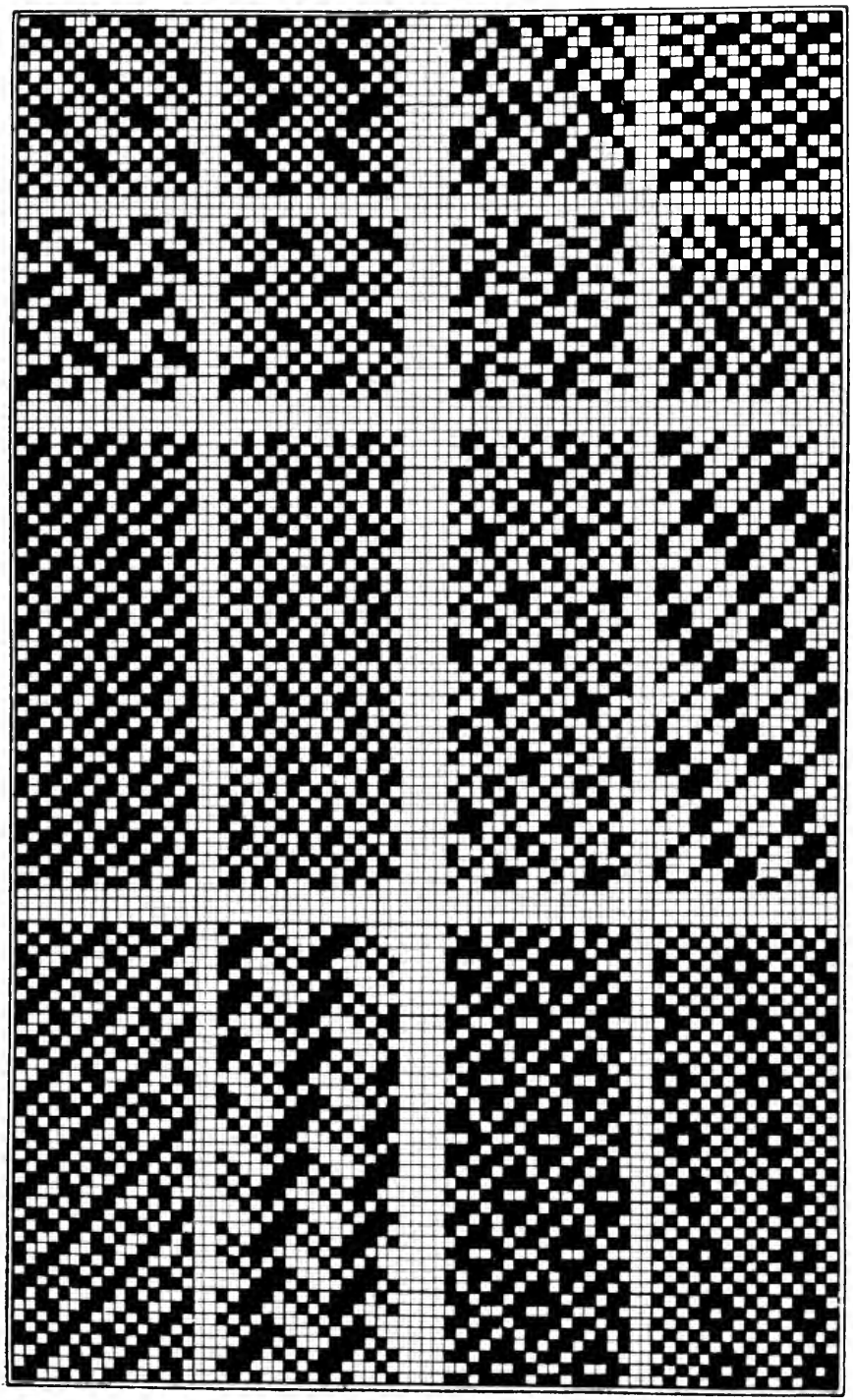

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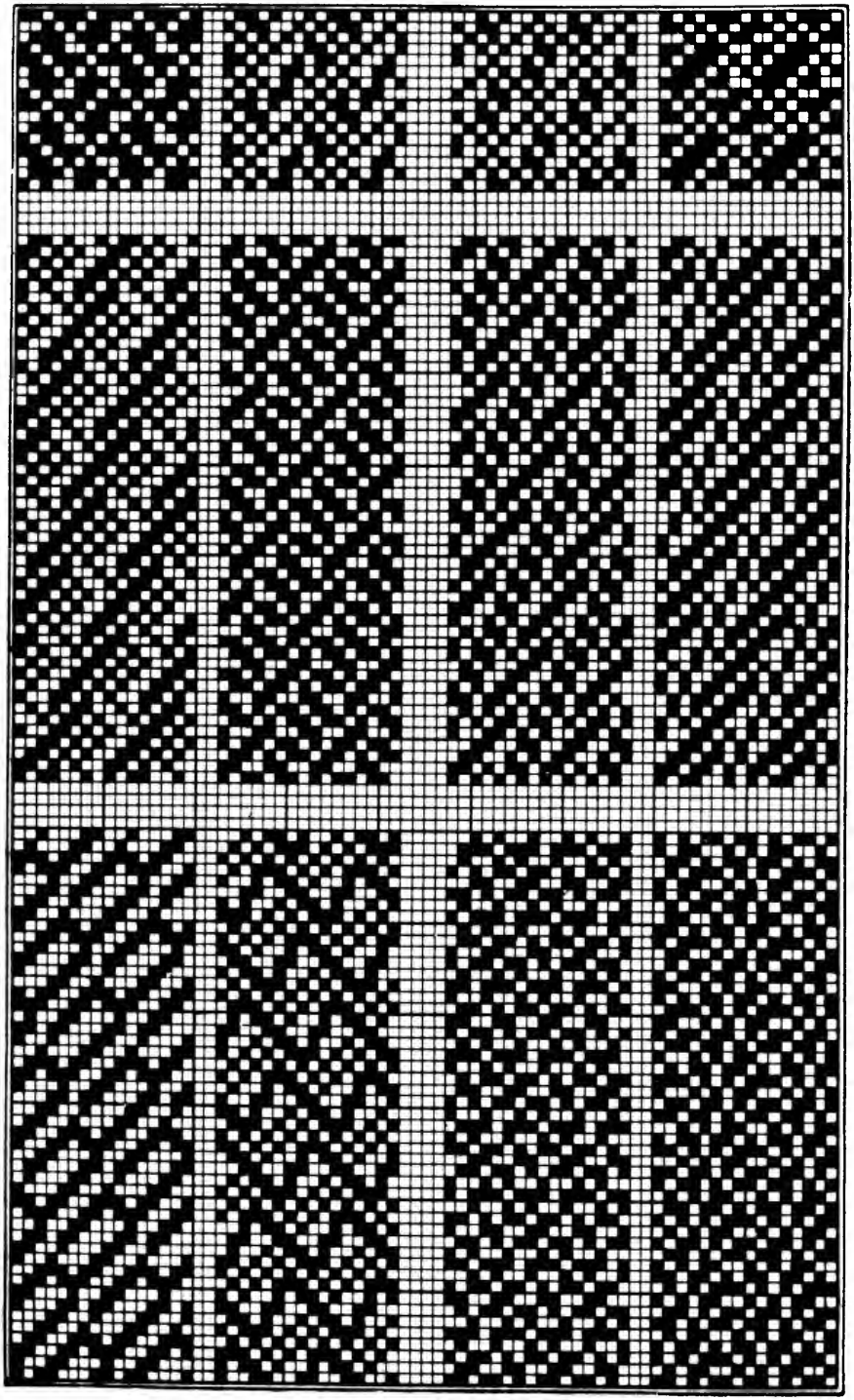

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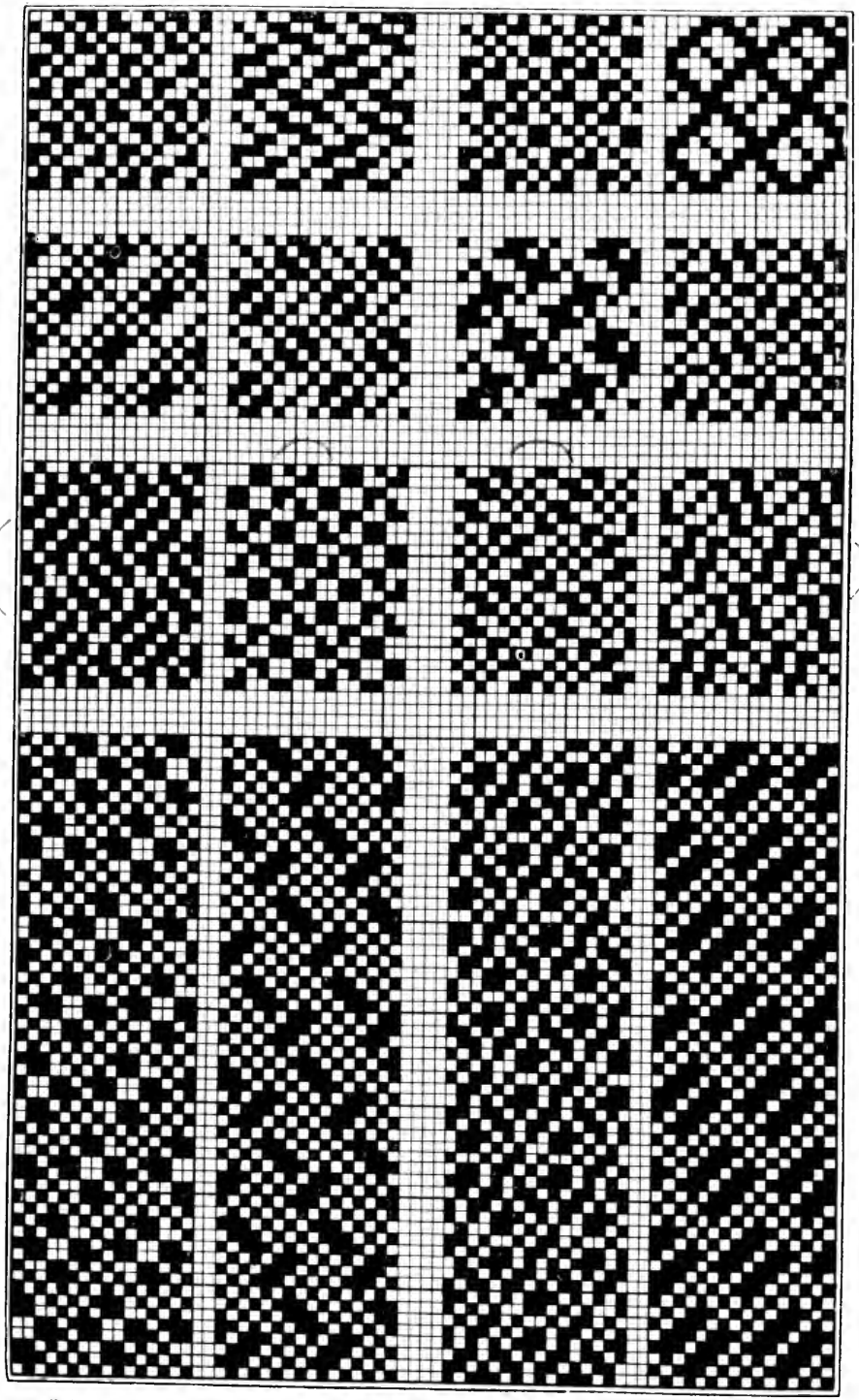

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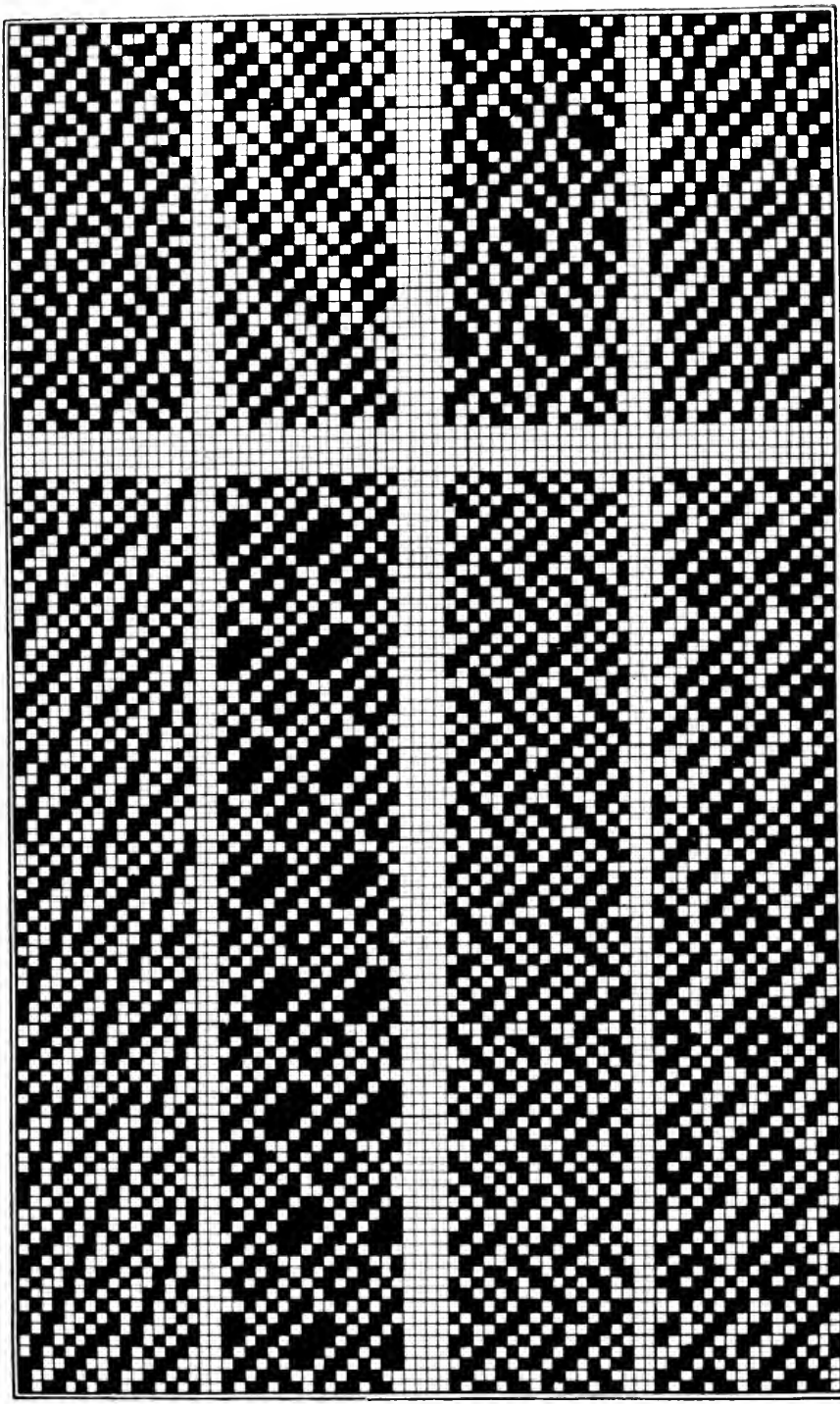

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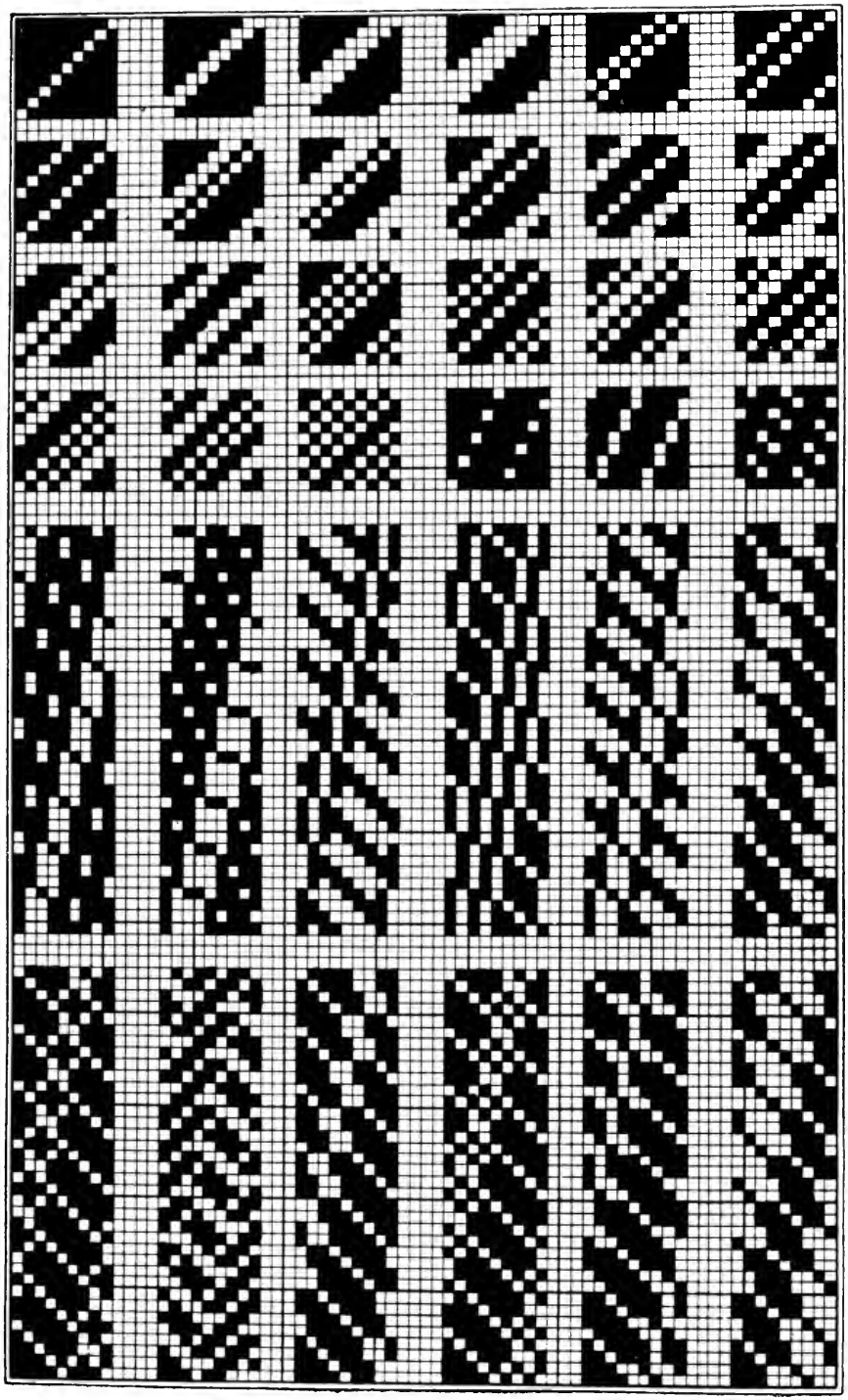

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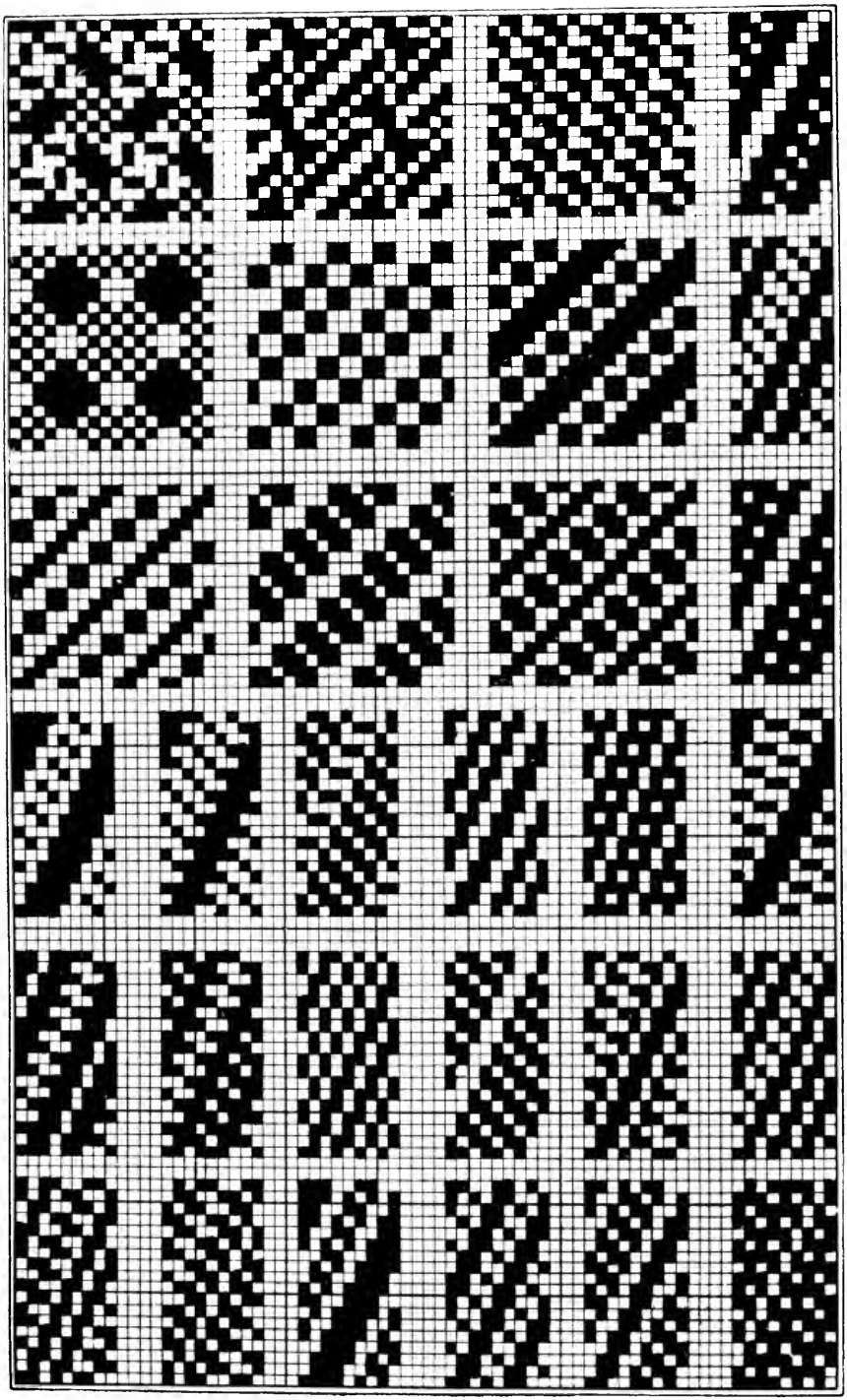

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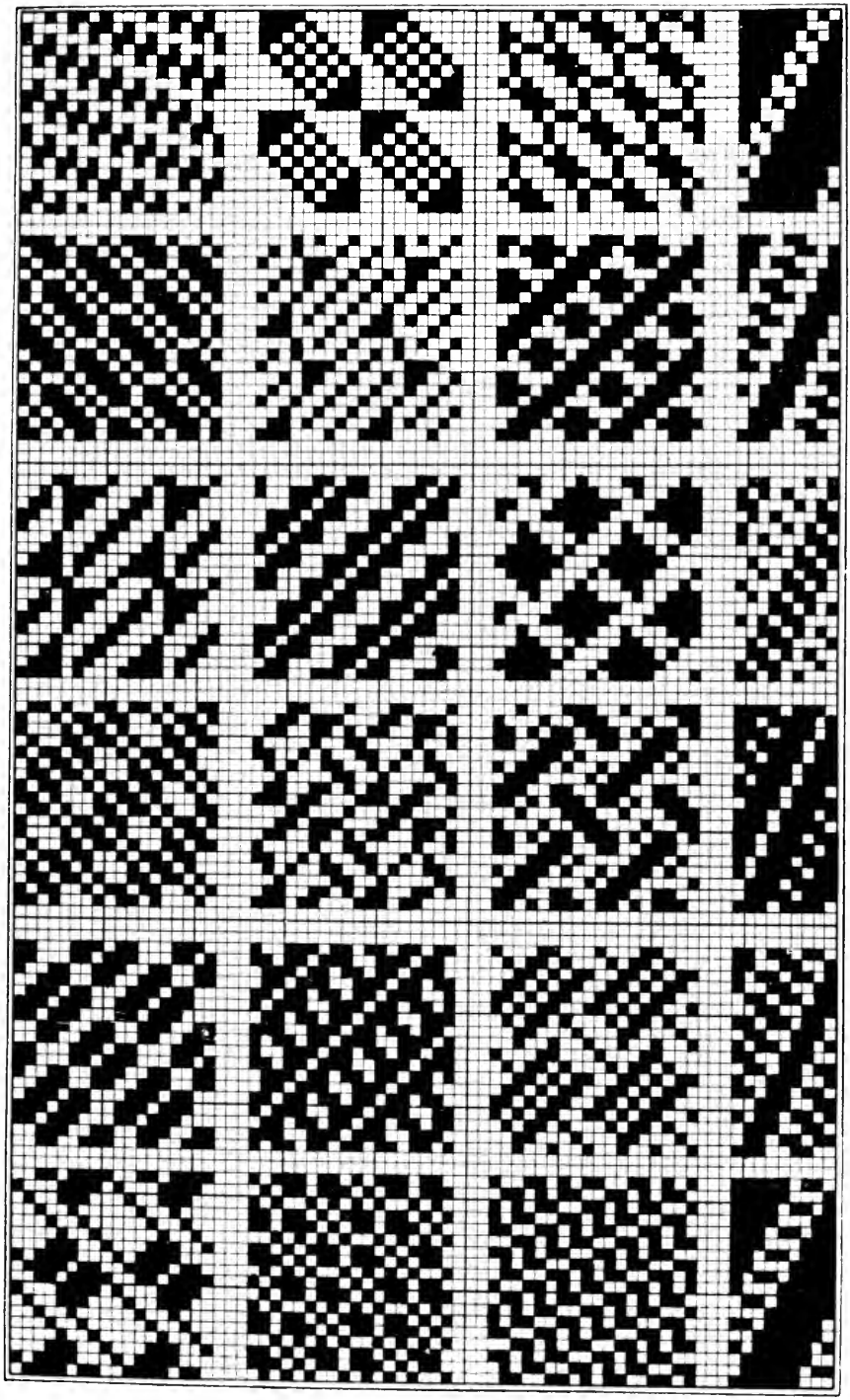

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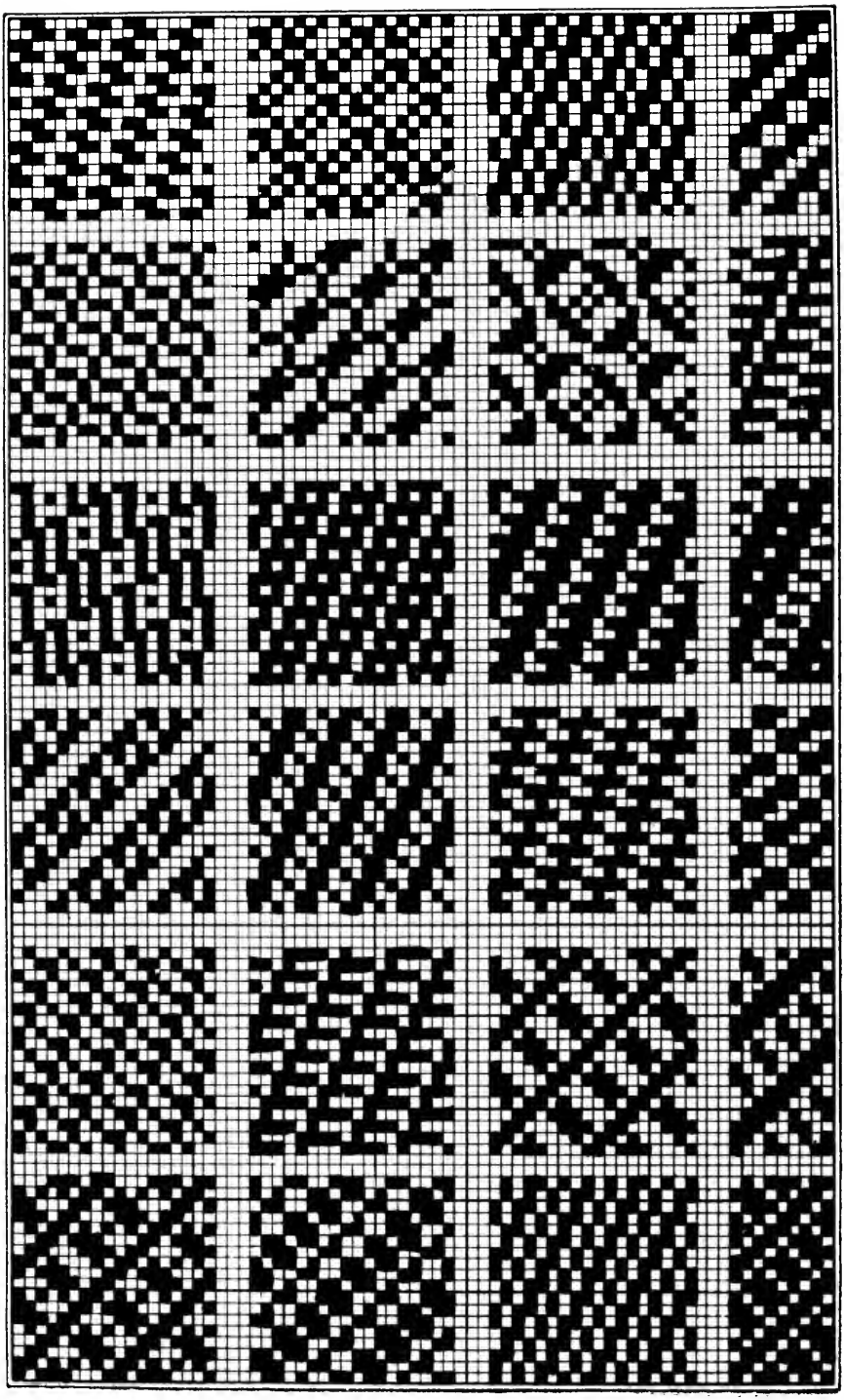

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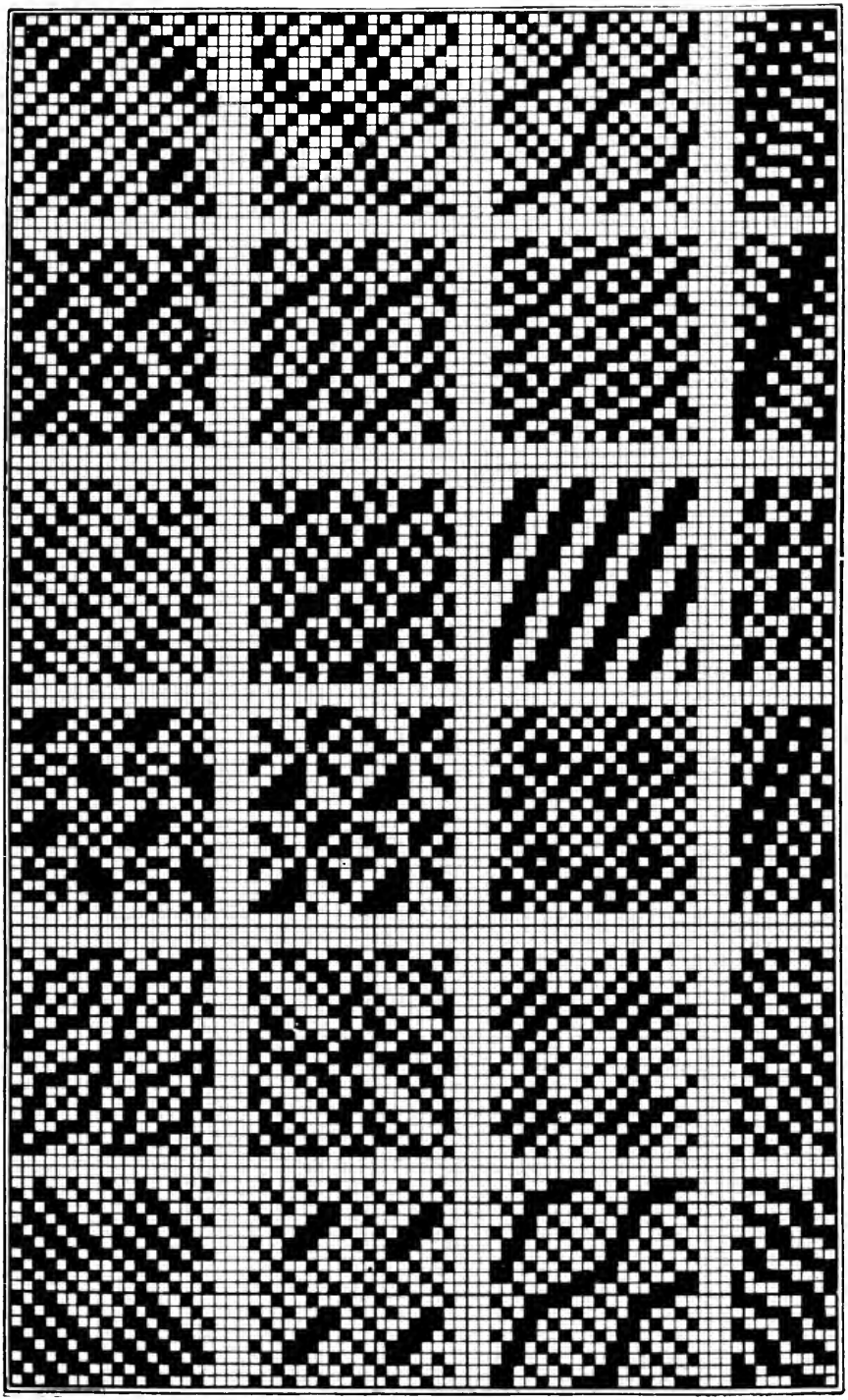

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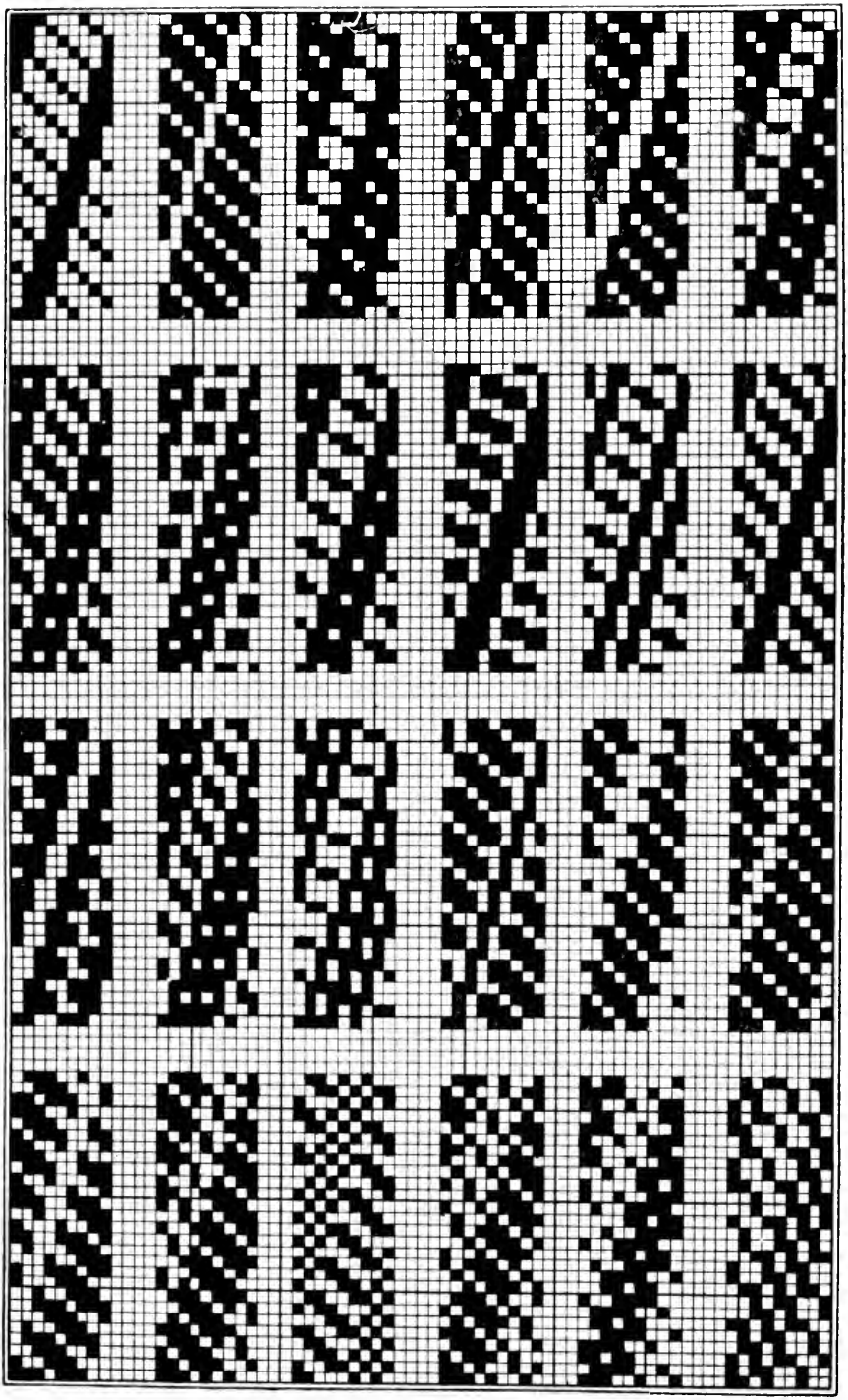

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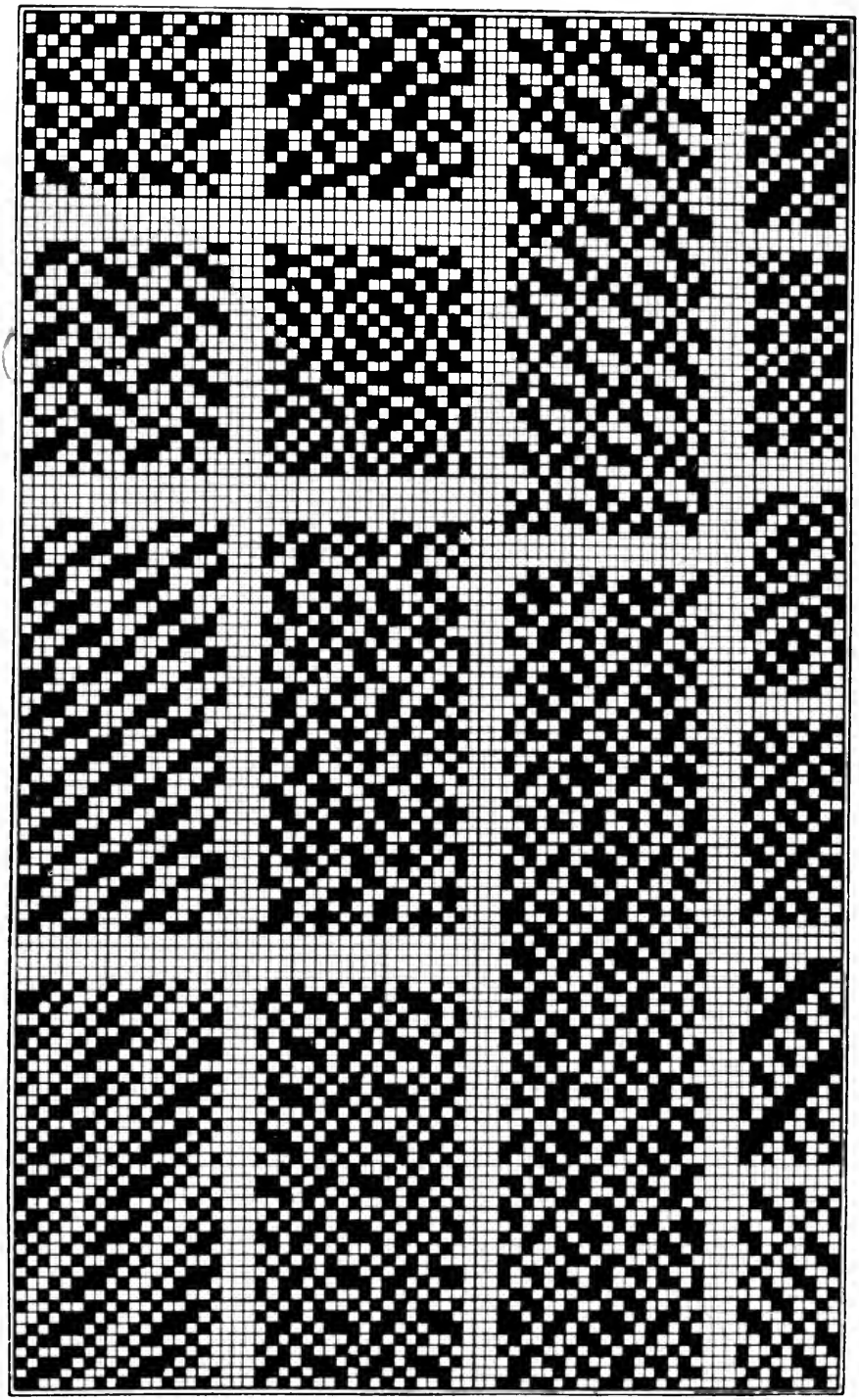

9 × 8 9 × 9 9 × 10 9 × 18 9 × 20 9 × 36 9 × 45 9 × 72

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The cuts in the fabric are shown at the places indicated by *e* and *f*. Letter *S* indicates the place where the first warp-thread and the first pick meet—the point for commencing to "pick-out."

After the sample is prepared according to the illustration just given, raise the first pick about $\frac{1}{8}$ of an inch with the "picking-out needle." See Fig. 1010.

Place the sample in the left hand as shown in diagram 1011, next ascertain the arrangement of interlacing pick number 1, warp-ways, until repeat is obtained.

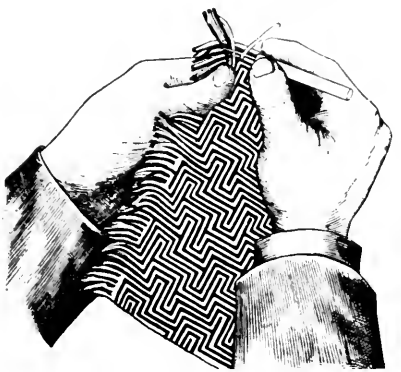

FIG. 1011

Every time a warp-thread is found situated above the filling, put a corresponding indication on the respective square of the designing paper (with pencil marks or prick holes with the needle), whenever you find the filling covering (floating over) one, two or more successive warp-threads, leave correspondingly one, two or more successive squares empty in the lateral line of small squares upon the designing paper.

After the intersecting of number 1 pick has been clearly ascertained liberate this pick out of the fringed warp edge and duplicate the procedure with pick number 2, to be followed by picks 3, 4, 5, etc., until the repeat is obtained. If dealing with a soft-spun filling yarn be careful in raising it, to avoid breaking the thread; also be careful that after the interlacing of the pick has been ascertained, it is *entirely* removed so that no small pieces of the thread remain in the fringed part of the warp; for if such should be the case it might lead to mistakes in examining the next adjoining pick.

III. Ascertaining Raw Materials Used in the Construction of a Fabric.

In most cases an examination of the threads liberated during "picking-out" with the naked eye will be sufficient to distinguish the material used in the construction of the fabric yet sometimes it is found necessary to use the microscope or a chemical test for their detection. For example: Tests might be required to show whether a certain thread is all wool or whether a certain thread is all silk, etc. For solving such questions, the following methods are given:

A common and ready method for ascertaining the difference between animal and vegetable fibres is to burn some of the threads of yarn in a flame. The vegetable fibre is composed of carbon, hydrogen and oxygen, while the animal fibre, in addition to these, contains nitrogen. By burning, the threads used in testing the first mentioned fibre will result in carbonic acid and water, while those of the latter, or of animal fibre, result in combinations containing nitrogen which element readily makes itself known by its peculiar smell or disagreeable odor similar to burnt feathers. Another point which it is well to note is the rapidity with which the thread composed of vegetable origin burns as compared with the burning of the thread having an animal substance for its basis. In the latter case, only a little bunch of porous carbon forms itself at the end submitted to the flame, and it does not form a flame as in the case of the former. As in some instances these two tests will be found unreliable, a more exact analysis may be required. If so, proceed after one or the other of the following formulas:

To Detect Cotton or other Vegetable Fibre in Woolen or Silk Fabrics.

Boil the sample to be tested in a concentrated solution of caustic soda or potash, and the wool or silk fibre will rapidly dissolve, producing a soapy liquid. The cotton or other vegetable

Posselt's Textile Journal

A Monthly Journal of the Textile Industries

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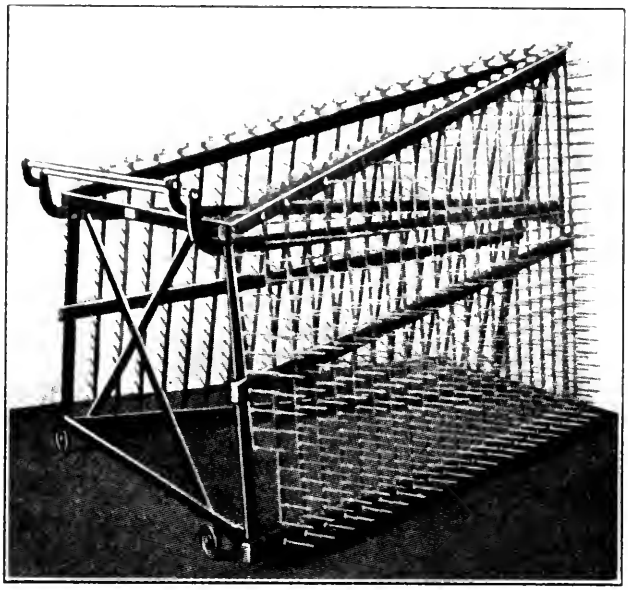

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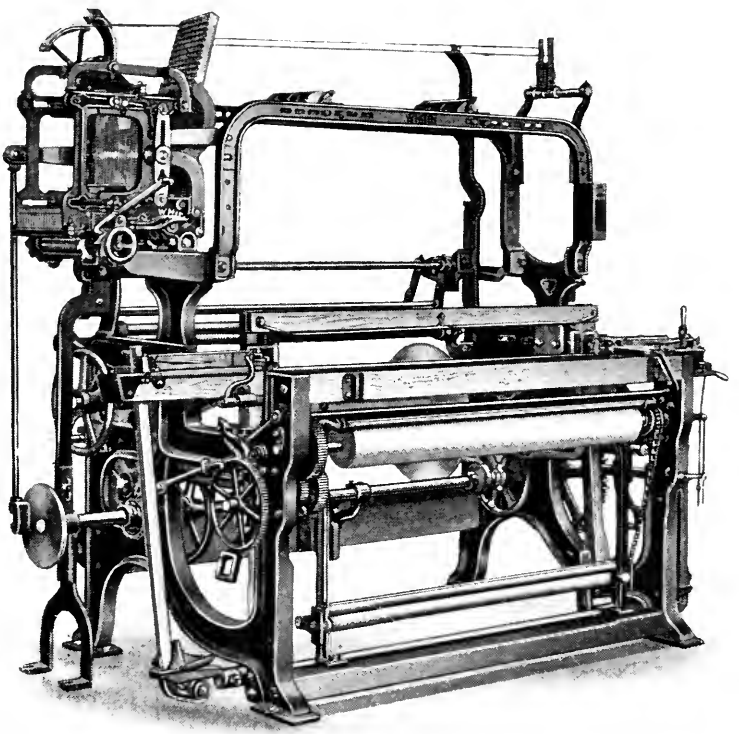

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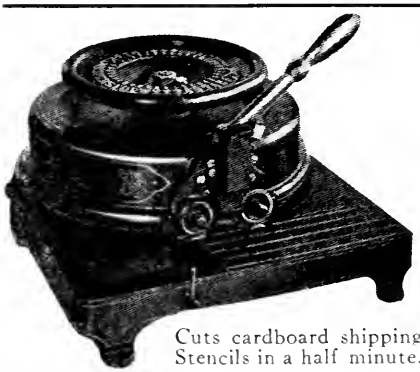

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large, white, coarse, long wool, and the breed has become practically native to this country. The structure of the fibres is shown in Fig. 10. In the Cotswold, we find the lines indicating the edges of

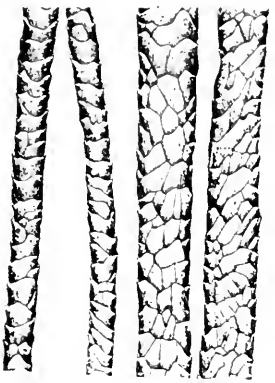

Fig. 9.

the scales more irregular and broken than in the Leicester and Lincoln; and more so in the Lincoln than in the Leicester. In all of them the scales are more or less oblong, but in width they are much larger than in the Downs and Merinos

If we compare locks of Cotswold and Lincoln wool

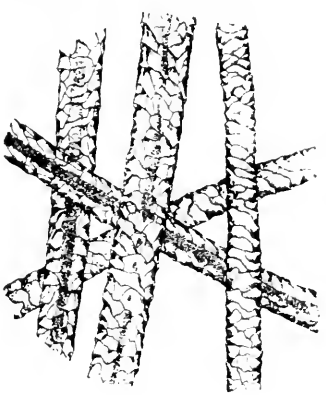

Fig. 10

we find that a larger proportion of the fibres in the former are more white and opaque than the others, and that the whole bunch has very much less of lustre than the Lincoln wool. When these Cotswold fibres are examined in the natural state with the microscope, we find extending through the centre a band of matter more or less broad, which is very much more opaque than the matter surrounding it.

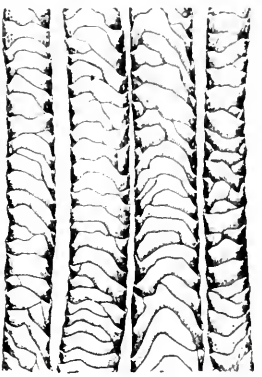

Fig. 11.

The forms of this band are given in the illustration of Cotswold wools. It appears to be of irregular thickness and to allow more light to pass through at certain places than at others.

The Oxford Down Sheep is also of English origin, being a cross between the Cotswold ram and the Hampshire Down ewe. The wool produced by the Oxford Down is finer and firmer than that of the Cotswold and has a staple of from 5 to 7 inches in length, the average weight of the fleece being 9 pounds. Fig. 11 shows typical specimens of these fibres highly magnified. The wool of this sheep, as well as that from the Cotswold, the Leicester and the Lincoln are the most important classes of what we term long staple wools, vice versa the Merino and the Southdown sheep, which are the most important

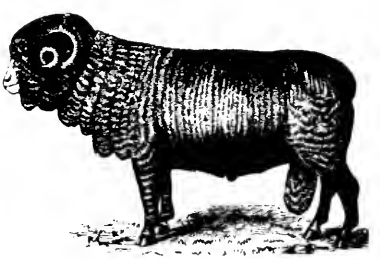

Fig. 12.

breeds of sheep, producing what we term short staple, carding or clothing wools.

The Merino Sheep. The original home of this animal is Spain, from there they have been spread

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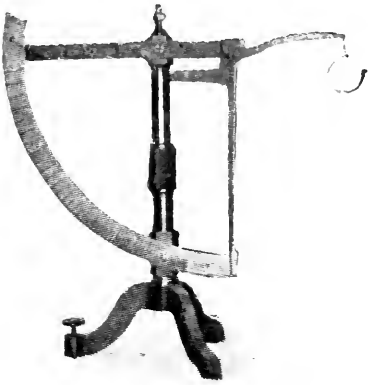

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Example.—Find the proper texture for warp and filling, and also ascertain the weight of flannel per yard from loom (exclusive of selvage). Cloaking: Warp 5-run, filling 5-run, backing 2½-run. Weave, see Fig. 40 (8 warp threads and 12 picks in repeat). Take-up of warp, 10 per cent. Width of cloth in reed, 72 inches (exclusive of selvage).

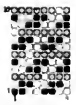

Fig. 40

5-run=8,000 yards per lb.

$\sqrt{8,000}$, less 16 per cent.=75 ends of 5-run yarn will lie side by side in one inch.

75 × 4= 300÷6=50 ends of warp must be used per inch, and

50 × 72= 3,600 ends must be used in full warp.

100 : 90 :: x : 3,600

3,600 × 100=360,000÷90=4,000 yards of warp yarn are required per yard cloth woven.

5-run yarn=500 yards per oz. 4,000÷500=8 oz. of warp yarn are wanted.

52 picks (50+2 extra) of face filling, } are wanted per inch

26 picks (corresponding to face picks) of back filling, }

52 × 72=3,744 yards of face filling are wanted.

3,744÷500=7.5 oz., weight of face filling.

26 × 72=1,872 yards of backing are required.

1,872÷250 (yards of 2½-run filling per oz.)=7.5 oz., weight of backing.

Warp,	8.00 oz.
Face filling,	7.50 "
Backing,	7.50 "
	23.00 oz.

Answer.—Total weight of cloth per yard from loom (exclusive of selvage), 23 oz.

SELECTION OF THE PROPER TEXTURE FOR FABRICS BACKED WITH WARP; i. e., CONSTRUCTED WITH TWO SYSTEMS OF WARP AND ONE SYSTEM OF FILLING.

To ascertain the texture of the warp in these fabrics we must first consider the counts of the yarn as used for the face structure, and secondly the weave.

After ascertaining this texture (for the single cloth) we must consider the weave for the back warp; *i. e.*, the stitching of the same to the face cloth. If dealing with a weave of short repeat for the back warp (for example a $\frac{1}{3}$ twill) we must allow a correspondingly heavy deduction from the threads as ascertained for the face cloth (about 20 per cent. for the $\frac{1}{3}$ twill); whereas, if dealing with a far-floating weave for the back (for example the 8-leaf satin) we will have to deduct less (about 10 per cent. for the 8-leaf satin) from the previously ascertained texture of the face cloth. Since the 8-leaf satin is about the most far-floating weave, as used for the backing, thus, 10 per cent. will be about the lowest deduction, and as the $\frac{1}{3}$ twill is the most frequently interlacing weave, in use in the manufacture of these fabrics, thus, 20 per cent. deduction from the respectively found texture of the face cloth is the maximum deduction. To illustrate the subject more clearly to the student we will give both weaves as previously referred to with a practical example.

Example.—Find warp texture for the following fabric: Fancy worsted trousering.

Fig. 41.

Weave, see Fig. 41. Face warp, 2/36's worsted. Back warp, single 20's worsted.

2/36's worsted =90 threads (side by side per inch).

Face weave $\frac{2}{2}$ twill =4 threads in repeat and 2 points of interlacing.

90×4=360÷6=60 threads, proper warp texture for the single structure.

60

−12 (20 per cent. deduction caused by the back warp ($\frac{1}{3}$) stitching in the face structure).

48

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SHEDDING MECHANISMS.

THE KNOWLES SHEDDING MECHANISM.

This mechanism is shown in the accompanying three illustrations, of which Fig 1 shows the complete shedding mechanism. Fig. 2 shows the top and bottom cylinders, also the vibrator and jack attachment, Fig. 3 shows the box mechanism for raising and lowering the shuttle boxes.

a, indicates arch of loom frame, *b*, the loom frame *c*, the bolts for fastening the arch *a*, on to loom frame *b*, *d*, indicates the top cylinder for operating shedding mechanism *e*, the bottom cylinder for operating shedding mechanism, *d* the part of top cylinder for operating shuttle boxes, *c'*, the part of bottom cylinder for operating shuttle-boxes *f*, the vibrator levers; *g*, the vibrator gears; *h*, the vibrator connectors; *i*, the harness jacks, *i'*, the comb for keeping them in proper position

Vibrator lever, gear and connector are the same for shedding and box mechanism, with the exception of the long connector *h''*, used for raising single box.

j, arbor of harness jacks, fulcrumed to rod *k*, fastened to the lower extension of arch *a*, of the loom frame

k' is a small rod running across the top of jacks for holding them down on the rod *k*.

l chain cylinder gear, fastened to the chain cylinder *l'*, by means of a soft set screw (not shown), so that provided any catch occurs no other breakage but the breaking of said soft set screw will result; *l''*, the boxes for holding chain cylinder and which can be raised or lowered by set screws *l'''*

m, two elliptical gears for transferring the characteristic fast and slow motion to chain cylinder *l'*. To the right of these two elliptical gears *m*, are seen two spur

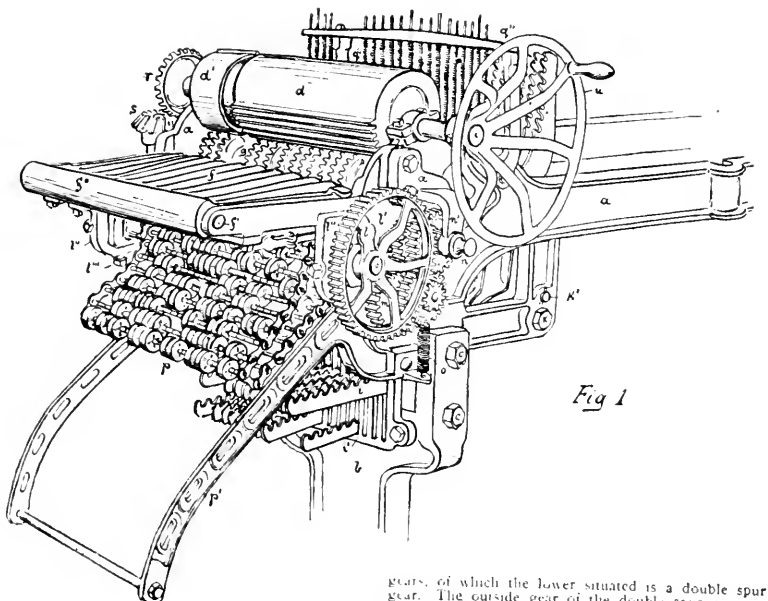

Fig 1

gears, of which the lower situated is a double spur gear. The outside gear of the double spur gear, is smaller and meshes into the teeth of the chain cylinder gear *l*.

n, the reverse key, held in position by casting *n'*, bolted on to loom frame *a*. This reverse key acts as a shaft for all the upper sections of previously referred to three sets of gears. It has a double key set in its shaft When the loom is in motion and the chain cylinder running forward, one of the lips fastens the top elliptical gear and also the previously referred to outside situated upper gear, which meshes with the chain cylinder gear *l*. If required to reverse the chain cylinder the reverse key *m*, is drawn out, in turn liberating the top elliptical gear and fastening the middle spur

gear, which meshes with the bottom double spur gear, thus in turn reverses the chain cylinder gear and its cylinder.

Spring o, connects to the lock knife o'. (See Fig. 3.) This lock knife is operated by means of finger o'', fastened to rod o''' by a set screw, and which finger in turn is operated by a cam (not shown) fastened on the bottom cylinder e.

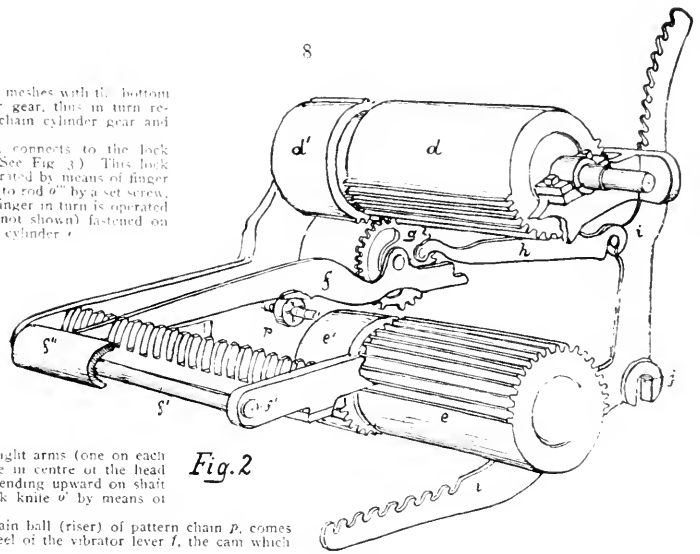

Fig. 2

Three upright arms (one on each end and one in centre of the head motion) extending upward on shaft o''' hold lock knife o' by means of set screws.

As the chain ball (riser) of pattern chain p, comes under the heel of the vibrator lever l, the cam which operates the finger o'' of the lock knife must be on its highest part, which causes the knife to be out, allowing the vibrator lever l, to change according to pattern chain. As the low part of the cam comes around, the spring o will immediately pull the lock knife in between the ends of the vibrator lever l, holding them steady while vibrator gears g, are rotating.

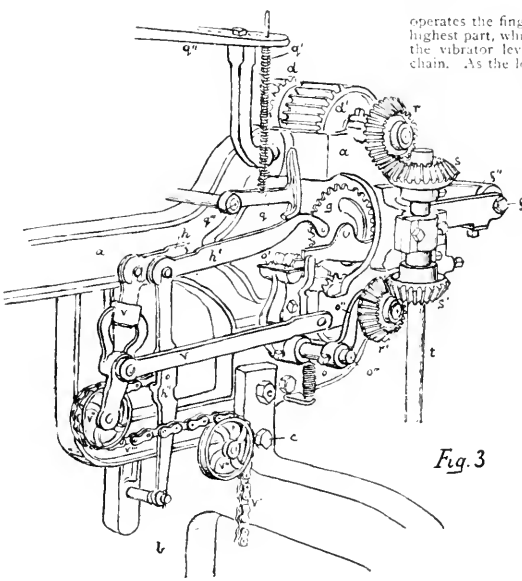

Fig. 3

p' is the chain rack for holding the chain in position and away from the jacks i.

Vibrator levers l, are fulcrumed on rod l', and held in position by shell l''.

Every vibrator connector h, has connected to it a follower-lever q, the object of which is to keep connector h, from flying back when the harness rises. Every follower-lever is pressed down by means of a spring q', held in position by rack q'' and turns on shaft q'''. Cylinders d and e, are driven by bevel gears r and r', which in turn are driven by bevel gears s and s' keyed to upright shaft t, driven either from crank shaft or bottom shaft of the loom as required.

u, is a hand wheel used by the operator for turning harnesses by hand when necessary.

h', is the lever for a single box lift (box No. 2), v, compound lever for raising box 3 and 4; v', brace for holding compound lever in position; v'', the pulleys around which box chain v''', runs for raising the boxes.

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Specimen Page of "Cotton Manufacturing, Part 1."

with the flats, we find that the bristles are mounted in two double series (extending diagonally across the width of the roller) in lags *A* and extend through brass plates *B*. The length which these bristles extend outside of plate *B* is regulated by a screw *C*, thus permitting ready adjustment of the bristles when worn, in order that they penetrate the teeth of the flats to the proper extent. It will be readily understood that the bristles of the brush penetrate the clothing of the flats deeper than do the wire teeth *D* which do the actual stripping, whereas the bristles will effect a thorough cleaning of the foundation of the clothing of the flats. Above the brush is mounted a tooth clearer *E* which in its normal position has its wire teeth *G* held only slightly in contact with the wire teeth *D* of the brush by means of a spring *F*, the action of its wire teeth on the wire points of the stripping brush being only to press the strippings into the latter and thus prevent their falling into the flats again. When it is necessary to clean the brush, the clearer *E* is moved from its position above the brush down to the lower position *E'* shown in the illustration and then pressed inward so that its wire teeth *G'* will penetrate into the wire portion of the brush, and when in turn the clearer is bodily moved up to its former position *E* while the brush is rotated in the opposite direction, this procedure effectually cleaning the wire clothing of the brush. The brush when in operation is driven at a slow speed, from 5 to 10 revolutions per minute, and on account of this as well as the few bristles used in its construction and their manner of adjustment, does not require to be singed, permitting also at the same time ready replacing of the bristles when worn.

Another stripping and cleaning apparatus for cleaning the flats of revolving flat cards is shown in its section by Fig. 96. The apparatus consists of the combination of a separate wire stripping brush *A* and a separate spiral bristle brush *B*, both of small diameter, carried by two end discs *C*, and revolving or traveling round the axis of a central driving shaft *D*. Both brushes (*A* and *B*) are driven by special gear wheel arrangement in such a manner that they are caused to revolve on their own axes at the same time, and in the same direction as they are traveling round said central driving shaft *D*. A circular comb *E*, also driven by special gear wheel mechanism, is attached, which strips or clears both brushes (*A* and *B*) automatically while the apparatus is at work, and in this manner the two brushes are always kept clean and efficient to perform their work. A hinged guard

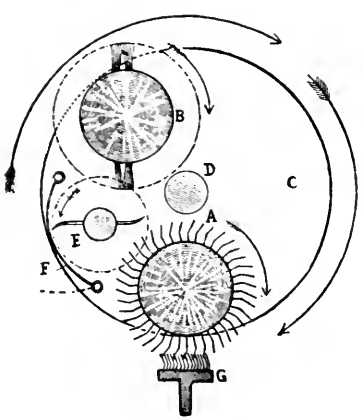


FIG 96.

serves the purpose to keep the slivers better down on the spoons *G*, thus obtaining a prompt action of the stop motion. From the spoons *G*, the slivers pass down a specially shaped guide plate *H*, each sliver being kept separated from the others by means of grooves or channels *I*, through which they pass. The slivers are in this manner brought

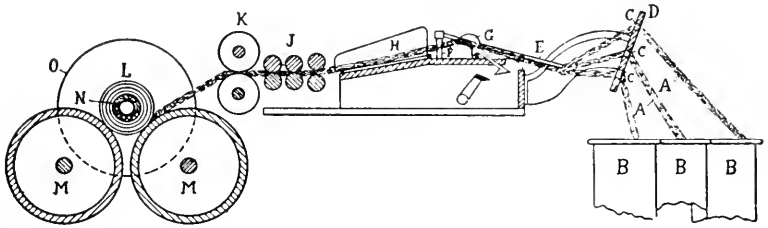


Fig. 106

together and made into a comparatively level sheet without overlapping each other as they enter the series of drawing rolls *J*, side by side. The object of the machine is not to draw the slivers out, but to lay them side by side in the form of an even lap, for which reason the draft in the rollers *J* is just enough to prevent bulkiness of the lap and should not exceed about $1\frac{3}{4}$ to 2. Emerging from the drawing rolls *J*, the cotton

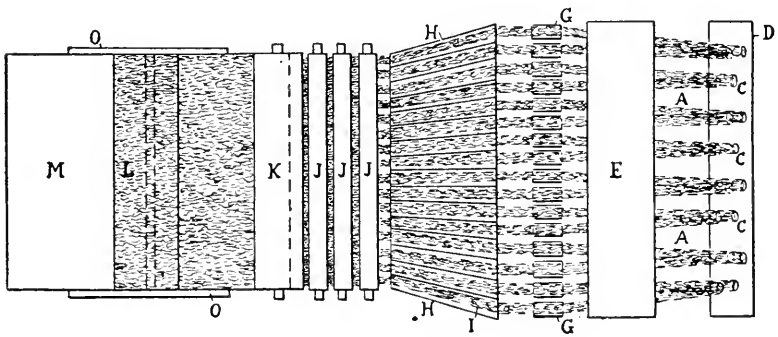
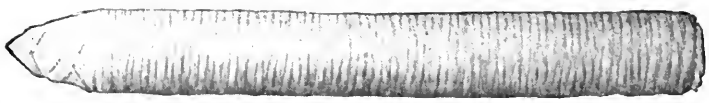


Fig. 107

is conducted between a pair of heavy calender rolls *K*, which compress it into a sheet or lap which enables it to be rolled up. The top calender roller *K* is weighted either by a spring or lever arrangement at each end, with from 80 to 140 lbs. pressure. After the cotton leaves the calender rollers *K*, it is wound in the form of a lap *L*, upon the wooden spool *N*



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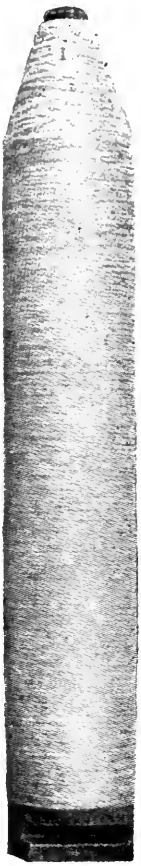

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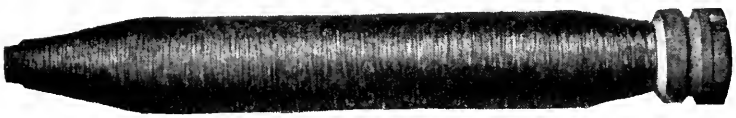

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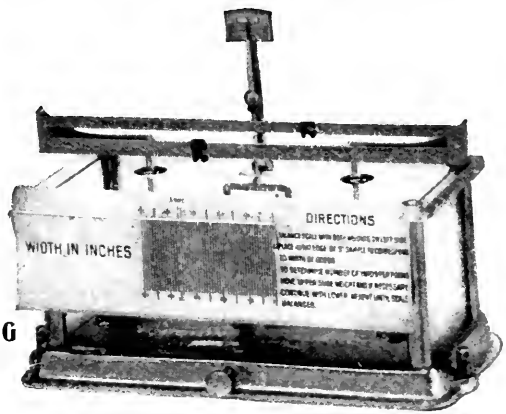

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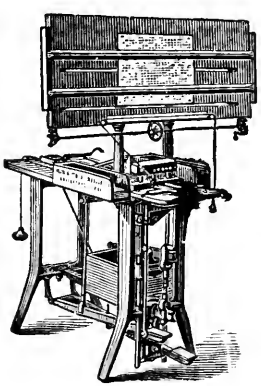

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